THE IRON AGE

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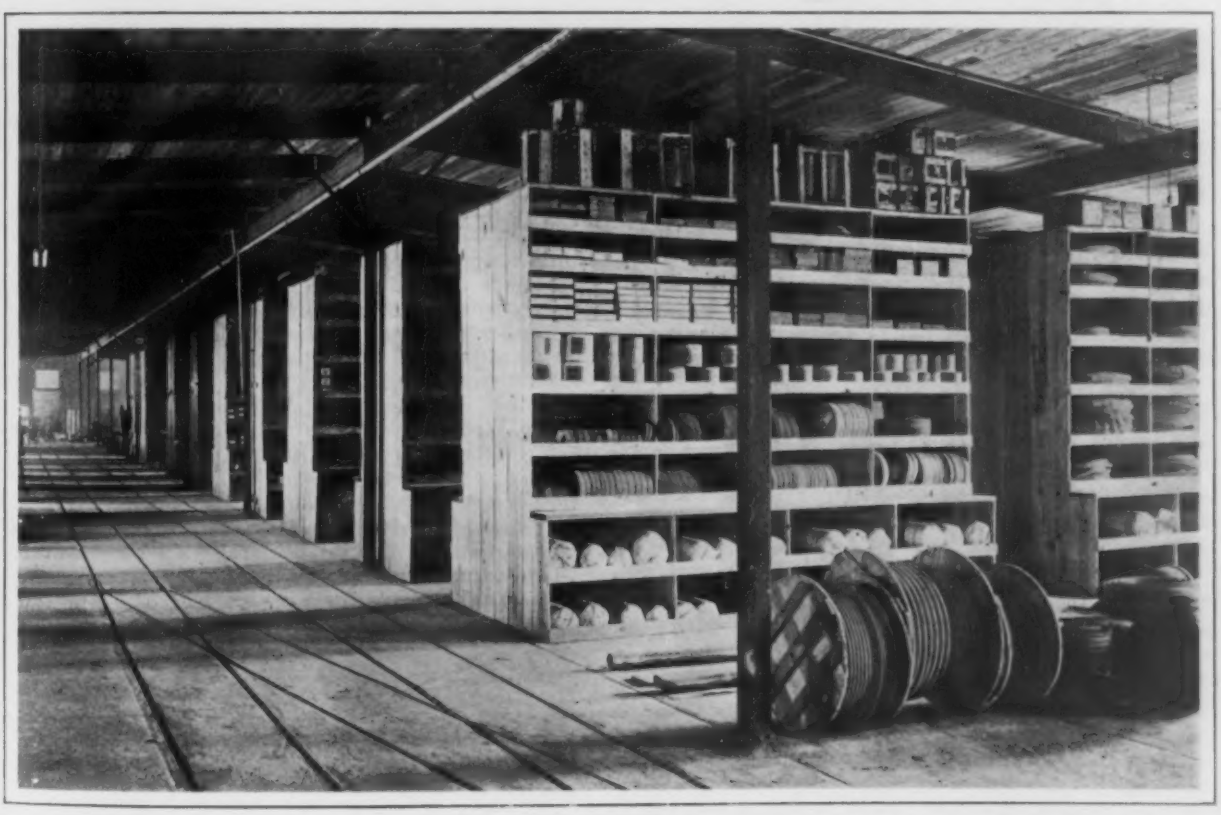
Cutting Handling Costs in a Jobbing Plant

A Louisville Warehouse Built to Reduce the Overhead and Running Costs of Receiving and Shipping Goods

BY G. D. CRAIN, JR.

The jobber of today, housed in a building in the congested district selected with respect to convenience for his customers and for deliveries, rather than with an eye to saving handling costs, frequently finds it impossible to do business with anything more than a microscopic margin of profit to work on. Storing goods in a building four or more stories high, and passing them from the railroad car to the wagon, to the chute, to the elevator, to the single to facilities for handling. As the jobber's entire operations, with few exceptions, are with regard to the handling of goods, it is plain that any savings he secures must be made here.

The new warehouse of the Laib Company, Louisville, Ky., is close to a model in regard to general design and lay-out, and in the way in which labor and handling costs have been reduced. The company handles metal goods of all kinds, including



Goods Received from Railroad Cars Are Loaded Directly on Warehouse Narrow-gauge Cars and These in Turn Deliver to Trucks in the Cross Aisles at the Proper Bins

bin, is a complicated and expensive process, which can hardly be justified on any ground.

The most successful concerns are those which are getting away from locations and buildings of that kind to plants on railway switches, where they can eliminate drayage charges on carload shipments, and sometimes on less than carload, and where they can lay out their buildings with an eye

plumbing supplies, steamfitters' supplies, contractors' equipment, mill supplies, etc., and had felt for some time before a fire which destroyed its former quarters at Fifth and Main streets, in the downtown district, that its facilities were not ideal and handling costs were too heavy. When fire made the reconstruction of the old building or the establishment of new quarters necessary, the company

promptly decided to move; and it is now located at Eighteenth street and Magnolia avenue, on the line of the Kentucky & Indiana Terminal Railroad, the local belt line, where it is able to receive direct carload shipments, and where it can frequently load out less than carloads direct into the car by special arrangement with the carriers. It is obvious that this one saving will enable it to increase its margin materially.

The building itself deserves attention on account of provision against fire, as well as convenience for the purpose for which it is employed. The structure has a concrete foundation and floors, brick walls, with wired-glass windows, steel beams and columns, and a composition roof. It is one story high, probably the ideal arrangement for a warehouse, and is 75 x 529 ft. in dimensions, running south from the railroad track for a full city block. The switch into the plant runs along the east side of the building, and 19 doors are provided, so that a car may be stopped at the door nearest the bins where the goods are to be stored. Here again is an object lesson in reducing handling costs. The building, it may be noted, is equipped with automatic sprinklers, in addition to which is an independent pipe-line supplying hose located at intervals of 100 ft.

Sixteen hundred bins have been provided for the storage of pipe fittings, brass goods and metal products. The advantages which come with unloading a car are duplicated in loading. A track runs through the center of the building its full length. It is 24 in. wide and over 500 ft. long. The rails and guides are imbedded in the concrete floor, making a permanent and almost frictionless railway. Trucks which run on this track are stopped opposite the bins from which goods are taken. They are first placed on small hand trucks and shifted without rehandling to the larger trucks on the track. These can be loaded to the extent of two tons, and one man can handle this load without difficulty. The average hand-truck in the average warehouse can be moved easily only when it is carrying a load of not more than 500 lb. Members of the Laib Company believe that the use of the track and the trucks has increased the efficiency of warehouse employees from six to eight times. The trucks are equipped with the cone type of bearings, and have metal frames, covered with wood. In many cases the trucks will be used as packing tables. The materials will be assembled as the truck moves along, marked and packed, so that they will be ready for the car when the truck reaches the shipping platform.

The trackage is given greater usefulness by the provision of switches and turntables, so that the trucks can be shifted without interfering with each other. The use of industrial tracks of this kind in jobbing plants is unusual, but members of the firm are so thoroughly convinced of their utility that the plan may be enlarged by the installation of electric storage batteries on the trucks, which are now operated by hand.

One of the principal operations performed in a plant of this kind is handling pipe, which is cut to length and threaded. In the old Laib plant the typical methods were in use, and five men were employed to handle the pipe, place it in position on the cutting machine and move it as required. In the new plant all of these operations are performed by one man, with the aid of a chain hoist and a specially designed truck which is operated on the track referred to.

The pipe machine is located with reference to the track, so that the truck carrying the pipe is in proper position for its operations. The truck has a stand for holding the pipe, being equipped with rollers on which the pipe rests. The rollers permit it to revolve as the threads are cut by the machine. The hight of the stand is adjustable, and it will handle pipe 6 to 12 in. in diameter, the weights ranging from 600 to 1500 lb.

At the south end of the shop, where the pipe machine is located, the company has a small but well-equipped machine shop, with power furnished by an electric motor. The shop will likely be enlarged in the near future.

A feature of the equipment of the building, which indicates that in working for mechanical efficiency and labor-saving short-cuts the company did not lose sight of the comfort and efficiency of its employees, is the number of toilets and shower-baths. Hot and cold showers have been provided for the office men, while separate toilets, with hot and cold showers, have been installed for the use of the white and colored laborers, respectively.

G. H. Laib, one of the members of the firm, the other being P. F. Laib, believes that the future of the jobber in the metal goods trade is largely in his own hands. "A jobber who is wasteful in his methods," he says, "and who is using excessively expensive methods of handling and storing goods, cannot expect the business community to continue to support him. He cannot hope to offer successful opposition to the distribution of goods through other channels."

The company was established in 1901. G. H. Laib was formerly with the Ahrens & Ott Mfg. Company, Louisville; the Riverside Iron Works, Cincinnati; the Crane Company, Chicago, and others, while P. F. Laib was with the Ahrens & Ott Company before going with his own concern. The Laib Company uses four motor trucks in its business, and has found them exceedingly useful.

Pneumatic Riveting Hammer Safety Feature

Among the provisions of the recently enacted safety appliance laws are those requiring the embodiment in the construction of riveting hammers of devices to prevent the accidental ejection of the rivet set from the nozzle of the hammer. To comply with these provisions the Ingersoll-Rand Company, 11 Broadway, New York City, has developed a retainer that is being placed on the market in connection with its Little David pneumatic riveting hammer.

The retainer consists of a single piece of heavy spring steel, closely wound into spiral form, one end of which fits over the outside of the nozzle hammer and hooks over a projection integral with the nozzle, the other end being wound to a smaller diameter. Sets for rivets over 7/8 in. in diameter are formed with a coarse thread and are simply screwed into place, while those for smaller rivets are formed with a shoulder and are slipped into the retainer while it is detached from the hammer, the shoulder being relied upon to hold it in place. In this way the rivet set or piston is not driven out, even though the hammer may be running free.

These hammers are made with either outside or inside triggers, in five sizes, for all kinds of riveting work. Two sizes of jam riveters which are particularly adapted for work in very cramped quarters on account of very short over-all lengths are also made.

Burton L. Verner, secretary, 1964 McCormick Building, Chicago, states that, as a great many members of the Western Scrap Iron and Steel Association are away on their vacations, it has been decided to postpone the next general meeting, which was to have been held July 21, for one month and the meeting will be held on the third Tuesday in August, which is the 18th, at the Hotel LaSalle, Chicago.

Planing Machine for Elevator Guides

A special planing machine has been recently built by the Niles-Bement-Pond Company, 111 Broadway, New York City, at its Pond Works, Plainfield, N. J. It is designed for machining material used for elevator guides accurately and rapidly. The machine is 52 in. wide between the housings; has a maximum distance between the table and cross rail of 18 in., and the table is 20 ft. long between pockets. Material ranging from 2 to 6 in. in hight can be accommodated.

The bed is of deep and substantial box section, with V-tracks for the table. These are oiled by self-adjusting conical rollers in pockets located at frequent intervals in the tracks. The table is also of box type and has a bottom wall without openings of any kind, this construction being relied upon to prevent chips or cutting fluid from reaching the gearing or tracks. Heavy gibs on each side hold the table against lifting or crowding sidewise. A set of clamps and end stops are furnished on the top of the table for securing six guide rails, side by side.

A Recently Developed Special Planing Machine for Use in the Making of T-Rail Elevator Guides

The cross rail is of less than the usual hight, and, as will be noted from the illustration, extends back between the uprights to which it is secured through T-slots in addition to clamps on the outer edges of the uprights. This construction provides rigidity for the cross rail and the uprights, and the necessity for this design will be apparent when it is taken into consideration that the cross rail is fitted with three heads on the face, each carrying eight tools for planing the sides of the rails. A cross slide carrying six tools for planing the edges is mounted on the under side of the rail. This gives a total of 30 tools, all of which are cutting simultaneously. On the front of the tool holder, over each rail, is mounted a chamfering tool which removes the sharp corner on the edge of the rail on the last cutting stroke. The holders are lifted entirely clear of the work at the end of the cutting stroke or lowered at the beginning by an air lift, the amount of movement required being automatically adjusted as the tool holder slides feed down.

The drive is of the builder's standard reversing motor type, a 35-hp. motor being directly connected to the table driving gear. The speed of the cutting and return strokes can be varied independently of each other, without stopping the machine by small handwheels on the front of the controller case, dials being provided on the handwheels which are graduated for the various speeds.

The hand control for starting, stopping and reversing the table is by a lever on the side of the bed and is the same as that on a belt-driven machine, so that the operator has no new movements to learn.

In common with the other motor-driven machines of this company, the motor is disconnected from the line at the instant of reversal and becomes a dynamic brake. To prevent the table from running off the gear, and also the breakage of tools or portions of the machine, resulting from a failure of the line current or an overload, a circuit breaker is provided that will stop the motor instantly by dynamic braking.

The Detroit Insulated Wire Company, Detroit, Mich., announces the following reorganization as of June 25, 1914: Joseph H. Hunter, president, was one of its original incorporators, served as vice-president and general manager and succeeded to the presidency February 20, 1914; J. G. Splane, the new vice-president, held a responsible position with the Standard Oil interests from 1887 to 1903, and on May 18, 1903, was elected president of the Pittsburgh & Allegheny Telephone Company; James Inglis, chairman of the board of directors, has been connected with the company as a stockholder since its inception, was identified with the American Blower Company since early manhood and as its president for the major portion of the time; C. C. Gray, the secretary and treasurer, has had charge of its selling activities since September, 1912; W. G. Dalgleish, assistant secretary and treasurer, has been advanced from an inferior position with the company through diligence and merit.

At the monthly meeting of the Bridge Builders and Structural Society, held in New York July 10, it was shown from careful reports collected by its secretary that in the month of May 56½ per cent. of the entire capacity of the bridge and structural shops of the country was contracted for.

Results of Applied Scientific Management*

An Exhilarating Showing of Improvements in Shop Conditions Reflecting a Sincere Attitude of the Employer to Co-operate

BY GEORGE DE A. BABCOCK†

The workmen carry out the orders as written on their job cards and instruction cards. The necessity of interchanging work from one machine to another has made it essential for economy that we have an all-around machine operator at each machine. That is, he must know how to handle his machine so that any job assigned to the machine may be prepared quickly and be finished accurately.

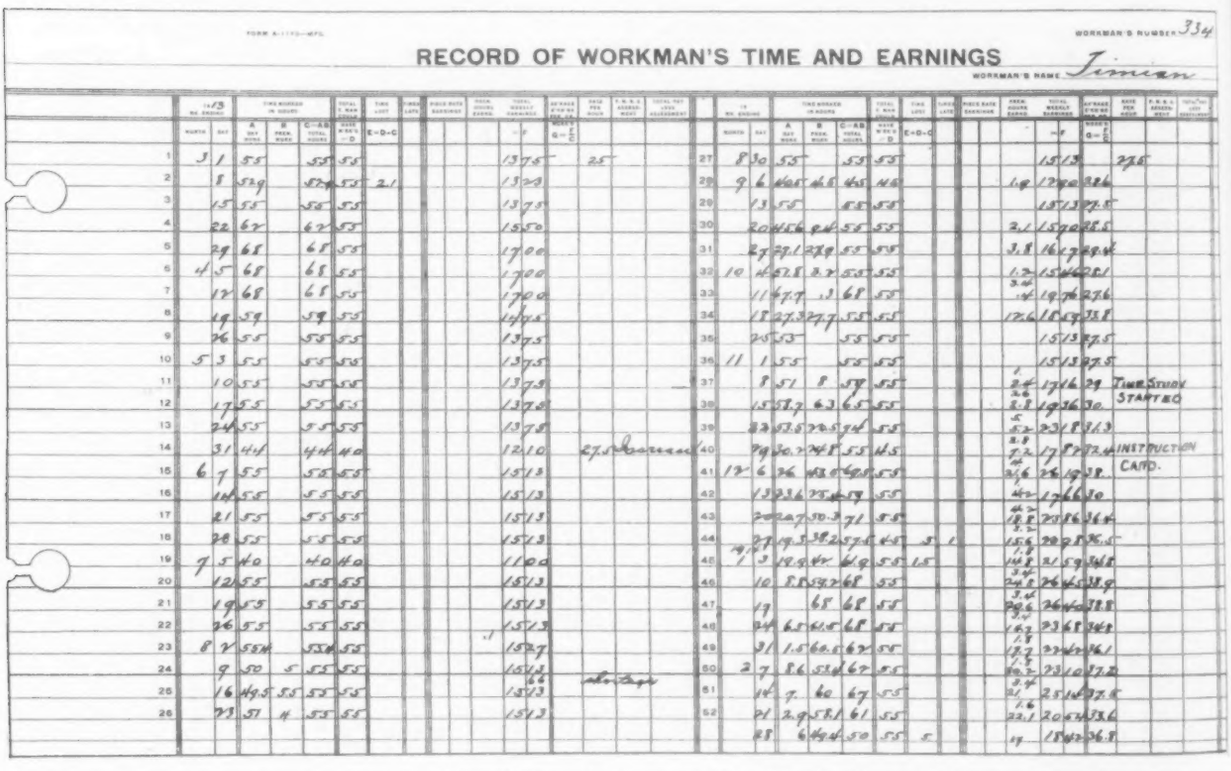
Due to the variety, it is of great help to them to have reference cards showing the different details of machine preparation and operation for each part. It keeps the work method standard and insures the proper tools being at the proper place on time. It is a very old-fashioned shop indeed that does not to some extent plan the way of work for its workmen, and it has been a long time since any shop, except the simplest job shops, has required the workmen to put on belts, make tools, secure stock, make drawings, do clerical work and one hundred and one other things that a long time ago were part of the duty of the workmen. The tremendous inefficiency of such a plan has eliminated it from manufacture. High efficiency necessarily requires specializing or singleness of purpose, and this is the order of our effort.

WHY WORKMEN DISLIKE CHANGES IN METHOD

It was noticed when starting time studies that the workman disliked very much to make a change of method; but when the change had been made, he did not want to change again either back to old or to any new. A study of the workman at his task and his own methods will soon show that he does identically the same act for the same effort day in and day out, and this is strictly true of every one of us. To change means accelerating either positively or negatively. Accelerating requires force, and of course that means work. It is the work caused by change that bothers workmen rather than the new method due to the change.

Time studies have been made almost entirely on the shop floors. These could be made in a time study laboratory with selected men, but we lose one of the most vital things for satisfactory conduct of this work, and that is what may be called the shop constant and fatigue allowance. We must make our time studies under the conditions we expect to operate. If made in a laboratory, we must expect to operate under the highest possible efficiency as indicated by the laboratory method after the work is put into the shop. Few shops have operating standard sufficiently high to do this. It takes time and a very great amount of work and cost to reach high standards, but it is without doubt the desirable end to obtain.

We are getting a fine group of workmen and


RECORD OF WORKMAN'S TIME AND EARNINGS

WORKMAN'S NUMBER 334

WORKMAN'S NAME Jiman

Fig. 20—How a Year's Record of the Individual Workman's Time and Earnings Is Kept, Giving, for Example, a Line on His Trustworthiness and Ability

*Conclusion of a paper presented to the National Metal Trades Association, Worcester, Mass., April 22. It has appeared substantially in full in consecutive issues, beginning June 4. It has been a remarkably complete, albeit terse, account of conditions before scientific management was inaugurated and of achievements highly satisfactory to both employer and employee.

†Production manager, H. H. Franklin Mfg. Company, manufacturer of the Franklin motor cars, Syracuse, N. Y.

trust that by continuous study and development we may reach a high state of perfection. It is difficult to determine what the true sentiment of the workman is with respect to this work, but from the time of introduction there has been excellent co-operation, and we believe that there will be until all can thoroughly appreciate the fact that we are after the best things that can be found for those concerned.

On the alternate day after the workman's effort he is given a report of his accomplishment of the day. This report shows the parts worked on, the day work earnings and the premium earnings.

Our method of pay is a fixed day rate with premium, not because we have selected that as being the best, but for the reason that almost any method of pay if based on time study will be fairly satisfactory. I believe that none is so equitable to the workman and management as Mr. Taylor's differential piece rates. Since, however, this demands a higher standard of shop performance than we now have, it has as yet not been adopted.

WHAT THE WORKMEN'S RECORDS SHOW

Duplicates of the reports to the workmen are used for compiling the pay rolls and distribution of work hours and are posted to the workman's time and earning record, such as is shown by Fig. 20. This record shows among other things lates and absences. A recent study from this record of men working under time study shows a very high percentage of attendance and a considerable reduction in so-called lates as compared to periods before they were working under time study. There was no indication by absences or lates of fatigue of the workmen. It is remarkable to note, as mentioned, that the attendance has been materially better, and is especially noticeable because the base or day rate was not reduced but has been gradually increased. The men's earnings are higher than before, so it is evident that they are not obliged to attend work on account of lack of sufficient pay as compared to the previous period.

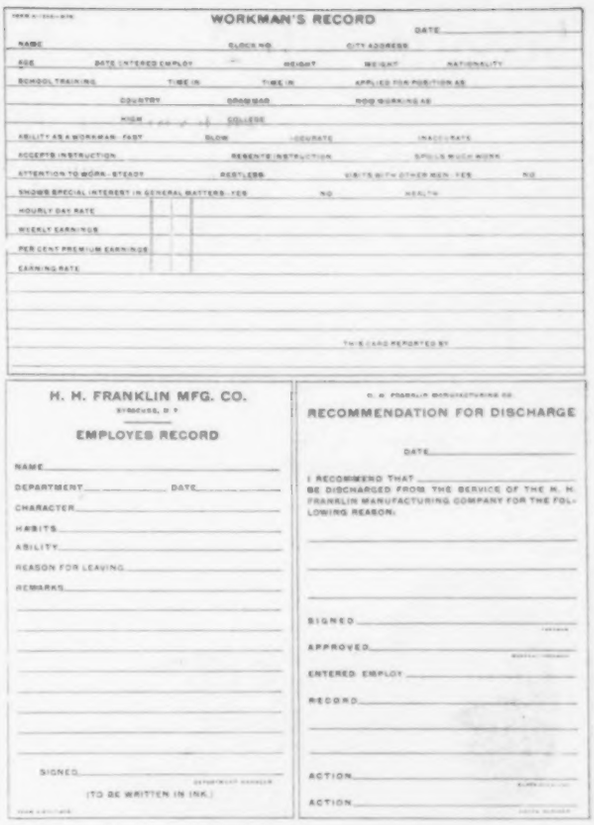
I am absolutely satisfied that there is not only no increase of fatigue for a given effort, but that there is a general decrease due to the continued uniformity of effort and the better preparation and maintenance of tools and equipment.

We maintain a workmen's record card as shown in Fig. 21. The record is obtained from the works every three months and compared for each period. They are classified under the different headings and percentages as to total and are continuously studied. Thus we learn the percentage of different nationalities in our employ, the percentage of fast or slow men, the percentage working at the task for which they applied, etc.

The data of the card are filled in first by the workman, then by the foreman, and then from the workman's earning record. After three or four periods have been reported for a given man, we obtain a first class statement as to his ability, and also as to whether he is working at the thing for which he applied. The fact that relatively few men are working at the task for which they applied may indicate that the men have gradually obtained that class of work which they found most desirable.

APPRENTICESHIP

For some five years we have conducted an apprenticeship training school. Boys are admitted between the ages of 17 and 21. They are selected for their capabilities, with a knowledge also of their habits. They are given two hours of class work daily; the remaining hours in the shops on their own machines, which are distributed among the machines of the regular workmen. They are under the discipline of the foreman. Outside of the shops in study, they are under the discipline of their instructor.


WORKMAN'S RECORD

DATE

NAME CLOCK NO CITY ADDRESS

AGE DATE ENTERED EMPLOY HEIGHT WEIGHT NATIONALITY

SCHOOL TRAINING TIME IN TIME IN APPLIED FOR POSITION AS

COUNTRY GRADUAD TRADE WORKING AS

HIGH COLLEGE

ABILITY AS A WORKMAN FAST SLOW ACCURATE INACCURATE

ACCEPTS INSTRUCTION RESENTS INSTRUCTION SPOILS MUCH WORK

ATTENTION TO WORK STEADY RESTLESS UNITS WITH OTHER MEN YES NO

SHOWS SPECIAL INTEREST IN GENERAL MATTERS YES NO HEALTH

HOURLY DAY RATE

WEEKLY EARNINGS

PER CENT PREMIUM EARNINGS

EARNING RATE

THIS CARD REPORTED BY

H. H. FRANKLIN MFG. CO.

SYRACUSE, N. Y.

EMPLOYES RECORD

NAME

DEPARTMENT DATE

CHARACTER

HABITS

ABILITY

REASON FOR LEAVING

REMARKS

SIGNED

(TO BE WRITTEN IN INK)

H. H. FRANKLIN MANUFACTURING CO.

RECOMMENDATION FOR DISCHARGE

DATE

I RECOMMEND THAT BE DISCHARGED FROM THE SERVICE OF THE H. H. FRANKLIN MANUFACTURING COMPANY FOR THE FOLLOWING REASON:

SIGNED

APPROVED

ENTERED EMPLOY

RECORD

ACTION

ACTION

Fig. 21—At the Top Is Shown the Card for Keeping a Record of a Workman's Capabilities, etc. At the Bottom Is the Face and Back of a Card Which Is Self Explanatory

The course covers all shop work and tool making and, on graduation after four years, the young men receive $100 bonus and 22 1-4 cents per hour. They receive pay to not less than $1 per day throughout their course. The studies in their class room correlates their machine shop practice. That is, if they are working on the drill press, they study in the class room, in addition to mathematics and design, the line motion of the machine feeds and speeds, the shape, quality and capability of the drill and the different kinds of work that is economical to handle under a drill.

We now have 30 apprentices, a number of graduates, and are adding to our apprenticeship force at the rate of 10 or 12 per year. With little change in our force, we thus fill many of our vacancies. With men of broad training at hand we have courage to carry out our ideals and secure the results for which we seek.

Hollow Metal Rods

The manufacture of hollow metal rods was recently noted in The Engineer, of London. It is stated that a patented process has been introduced by the firm of Dunford & Elliott, Sheffield, England, whereby hollow steel bars of ¾ to 3 in. in diameter and 20 ft. in length are produced by rolling from a drilled ingot. After the billet has been pierced, it is packed with a kind of sand capable of resisting high temperatures. The hole is plugged at each end by metal plugs, and then heated to the necessary temperature, the billet is submitted to repeated rolling operations until a bar of requisite dimensions and section is produced. It appears that the packing material acts as a fluid or as an elastic mandrel, maintaining a hole right through the bar. After elongation the core is removed by a special process.

Good Carwheels from Chilled Cast Iron*

How to Make White Iron Harder and More Resistant to Wear—Problems Involved in Strengthening Flanges

BY E. B. TILT†

The consideration of chilled cast iron in the following notes is particularly with reference to its use in carwheels. The problem is to make a sound wheel which will be safe and which will give good wearing qualities. All questions of design, including flange and plate thickness, which also include weight, have been disregarded, and the question is a metallurgical problem on how to make white iron harder or more resistant to wear, and how to make the combination of white and gray iron in the flange stronger or tougher as well.

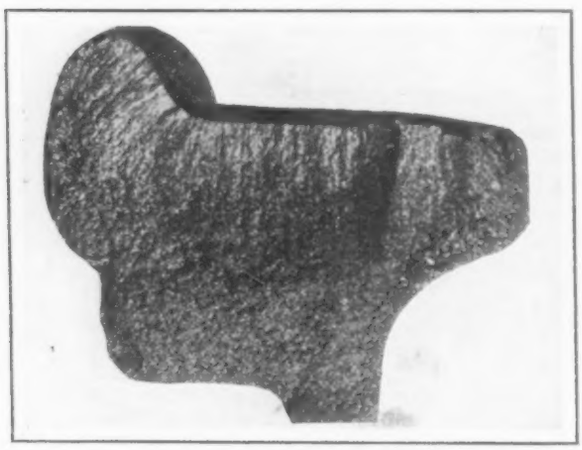


Fig. 1—A New 675-Lb. Master Car Builders' 1909 Design of Wheel

Fig. 1 shows a new 675-lb. Master Car Builders' 1909 design of wheel in accordance with the specification with reference to chill. It may be stated that the Master Car Builders' specifications prescribe a method of selecting representative wheels for test, which are drop-tested for strength and thermal-tested (1½-in. ring of fluid iron poured around the tread) to show their capacity to resist the heating action of the brakes. All wheels are inspected for molding defects. Fig. 2 shows a flange which has been knocked off with a hammer to show the direction of break. This is one of the greatest sources of danger in the cast-iron wheel, though a seam at the throat very often precedes failure. Fig. 3 shows a typical failure due to over-heating by the brakes. Figs. 4 and 5 show "brake burns" and "shell outs," respectively. These are minor defects, but to increase the service of the wheels they should generally be a minimum. It is not known whether metal which shells out or brake-burns easily is dirty or has more impurities than a metal which does not.

There is at present some disagreement among authorities on chilled cast iron as to the best mixtures. Some contend that charcoal iron of chilling quality is necessary (No. 1); others that steel scrap and ferromanganese (No. 2) serve the same purpose. A representative mixture of each is approximately as follows:

Mixture No. 1

	Per cent.
Charcoal pig iron	70
Scrap wheels	30

Mixture No. 2

	Per cent.
Coke pig iron	45
Old wheels	45
Malleable scrap	5
Steel	5

Wheels made by each mixture meet the specifications, and the advocates of each seem satisfied with the service results obtained. In the author's opinion the latter depends on the final composition, care of manufacture and inspection. Direct comparisons are difficult to make on account of different methods of keeping records; and comparison of wheels made now of coke iron with wheels made years ago of charcoal iron are difficult on account of changes in the service conditions.

The improvement of the chilled iron lies then in the elimination or variation of certain of the constituents and their compounds, which compose the wheel; or in the addition of other elements or compounds. A representative analysis of the present-day wheel iron, using coke pig iron and steel, is as follows:

	Per cent.
Total carbon	3.60
Silicon	0.60
Manganese	0.50
Phosphorus	0.30
Sulphur	0.12
Iron	remainder

It is supposed that the metalloids and their compounds, and the compounds of silicon and manganese, compose about 30 per cent. of the total volume. Any one of the above can be varied by methods commonly known in foundries, and the best proportions are not definitely settled. Nickel, chromium, vanadium, titanium and other metals have been used with results not always exactly determined.

It is the author's opinion, to be confirmed by further experiment, that the amount of total carbon should be low, say about 3.40 to 3.60 per cent., rather than about 4 per cent., as with many white irons. The silicon content will generally be somewhat higher than the manganese, both regulated by the practice of any particular foundry, but in the neighborhood of 0.60 per cent. Good wheels are made with sulphur as high as 0.17 per cent. and phosphorus 0.50 per cent.

Fig. 2—Flange Knocked Off with a Hammer, Showing the Direction of Break

*A paper, substantially in full, presented at the seventeenth annual meeting of the American Society for Testing Materials at Atlantic City, June 30 to July 3.

†Engineer of tests, Canadian Pacific Railroad, Westmount, Canada.

An examination of Fig. 1 shows the flange to be white iron in part, and Fig. 2 shows the broken flange continued down through the gray iron, which is the usual direction of breaking. Fig. 6 shows stress-deformation curves for gray irons from the

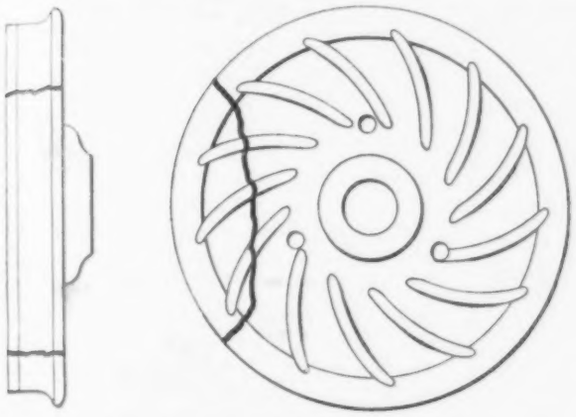


Fig. 3—Typical Failure Due to Over-heating by Brakes

sources noted, and for comparison the curve for the common steels is included. A curve for white iron is shown where it is thought it might be found, and from a consideration of this it is evident that the flange strength is dependent upon two substances. The first is the white iron which carries almost all the load until rupture takes place in it, when the gray-iron back takes the load. We have thus successive failure of the white and the gray iron, and it is evident that if both could be of the same elastic ratio an improvement would be made. A consideration of this suggests no possibility of attaining such a desideratum, so that a possible solution is to have as much white iron (a portion being necessary for wear) as can possibly be allowed, and thus also to have the gray iron as hard as possible without its being too brittle in the plates.

In order to see whether the strength of white iron varied appreciably in our regular practice, it was decided to test chilled circular rolls, 2 in. in diameter (barber rolls), and partly chilled rectangular bars, $1\frac{1}{2} \times 2\frac{1}{2}$ in. The combination chilled and gray-iron bars are similar in structure to the flange

Fig. 4—"Brake Burns"

of a wheel. These were drop-tested on 10-in. supports with a tup of 42.3 lb., caught on the rebound. There was a difference in the coarseness of the chill on the roll, which was weak. On account of the elastic limit and tensile strength of chilled iron being practically the same, the drop is started at 8 in. and increased 1 in. at a time until the bar fails. The difference in hight of the drop to break bars of widely different mixtures, in chills and in green sand, is given in Table 1.

The wheel iron is the strongest, whether cast in chiller or in green sand. An interesting point is that when the wheel-iron bars are annealed in the pits with the wheels (a period of four days), the average hight of drop decreases from 15 to 12 in. This would suggest that unannealed flanges are the strongest. When the unannealed bars are heated to 500 deg. F. and tested at that temperature, the average hight of drop is increased from 15 to 20 in. This suggests less liability to strip flanges by blows

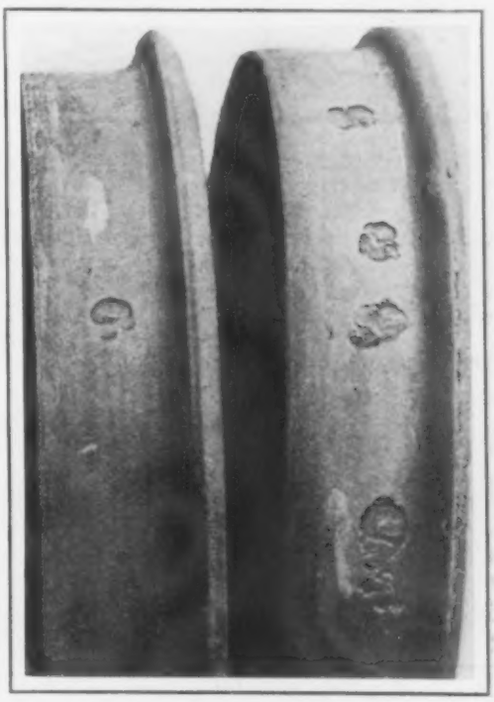


Fig. 5—"Shell Outs"

under heavy brake service, when the wheels would be hot.

Records were kept for a number of months' operation of the wheel foundry, by plotting the results of drop tests of chilled rolls, of $1\frac{1}{4}$-in. square transverse test bars, of the chill on chill blocks, and of the hardness of the chilled rolls. A consideration of these results seems to show that the greatest strength of the white iron is accompanied by the greatest hardness, though the variation due to composition, or any other cause than flaws in the test specimens, is small.

Table 1—Hight of Drop to Break Bars of Widely Different Mixtures

Quality of iron	Silicon, per cent.	Combined carbon, per cent. (estimated)	How cast	Chill	Hight of drop to break, in.
Wheel iron..	0.68	3.50	Chiller	Completely	15
Wheel iron..	0.68	1.00	Green sand	None	27
Cylinder ...	1.27	....	Chiller	Around edge	14
Cylinder ...	1.27	0.90	Green sand	None	21
Machinery ..	1.60	....	Chiller	Mottled throughout	10
Machinery ..	1.60	0.60	Green sand	None	18

Representative drop tests on the half-chilled

1½ x 2½-in. bars with the white iron down or in tension, are shown in Table 2.

The difference in the amount of chilled iron has very small effect on the strength. This is in agreement with the foregoing, as the difference in amount is at or near the neutral axis and the strength of the metal at the surface varies very little.

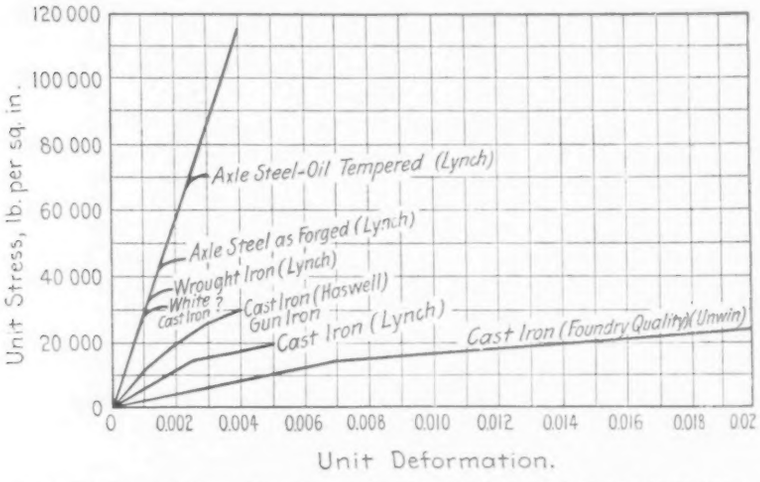


Fig. 6—Stress-Deformation Curves for the Common Steels and Cast Iron

In order to get a direct measure of the strength of the flange, we have been drop-testing the flange of the wheels on a small drop-testing machine, with a 25-lb. tup falling on a striking block 2 in. wide with a face having the contour of the throat of the flange. The wheel to be flange-tested is bored to a tight fit on a mandrel which forms a part of the foundation of the testing machine. After some experimenting 6 ft. was taken as the hight from which to drop the weight, and by taking one given weight and design of wheel, we have found that for the same mixture the number of blows to break off the flange is inversely as the chill. This means that a soft wheel has the strongest flange. In service we have more stripped flanges in soft wheels than in hard, but this is due to the development of cracks in the throat of the flange. This suggests that the design of the wheel and care in securing enough chill are more important than differences in quality or source of the iron.

Table 2—Drop Tests on Half-Chilled Bars

	Depth of chill, in.	Hight of drop to break, in.
Maximum	1.30	18
	0.95	18
Minimum	1.05	12
	0.60	12
Average	1.20	13.5
	0.75	14

A possible improvement in wheel iron, to avoid trouble with broken wheels, is the making of an iron with a low coefficient of expansion under brake action. Heavy braking results in heating of the tread, with consequent expansion and pulling apart of the plates; it is the ability to withstand this service that is shown by the thermal test. Thermal tests on a large number of wheels show an increase in diameter of about 1/16 in. after the iron ring has been on two minutes, failure taking place after an increase of anything from 3/64 in. up, depending upon how much white iron or combined carbon is in the plates of the wheel. The harder the wheel the more readily it is broken in the thermal test. Part cooling curves for wheel iron are shown in Fig. 7, and it would seem that shrinkage is fairly uniform for most irons of similar composition after solidification has taken place. Note the expansion in cooling of one wheel mixture which was soft. A wheel poured from this would have the flange and tread chilled and set at once and the expansion due to the gray iron behind might cause some checking of the chilled iron, which would show as a defect developed later in service. So too it has been thought by some that brake heating produces circumferential throat seams, due to expansion of the tread which is resisted by the flange. If low-expansion iron is a possibility this tendency would be lessened.

Whether unclean metal or metal high in sulphur or manganese is the most likely to shell out, the author cannot say, and it is hoped to get some connection between this trouble and the different coefficients of expansion of the compounds forming the metal. Experiments have been in progress for some time and many test heats have been taken off. The fuels used have been high and low sulphur cokes and anthracite coal, and the mixtures have varied from all-scrap wheels to mixtures with charcoal iron and malleable and steel scrap. Six test wheels have been cast from each test heat, of which two each have been thermal, drop and flange tested. Up to the present there has been no improvement on our standard mixture containing scrap steel. There have been only a few analyses and the tests, to show improvement, have been confined to those ordinarily made on wheels and bars, as given above. Our test work is to continue and it is our expectation that we will find mixtures and perhaps methods to improve the cast-iron wheel.

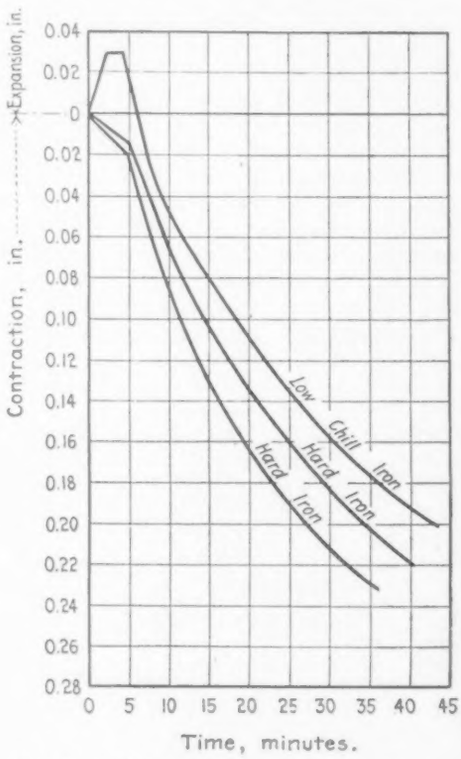


Fig. 7—Shrinkage Curves for 1 In. Square Bar, 12 In. Long, Wheel Iron, Cast in Sand

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The Cleveland office of the General Electric Company has taken an order from the Berger Mfg. Company, Canton, Ohio, for a 1000-kw. mixed pressure turbine, a 500-kw. motor generator set and other equipment, including exciters, switch-board and transformer.

POWER FROM MOLTEN SLAG

Utilizing Heat for the Generation of Steam for Use in a Low-Pressure Steam Turbine

The Slag Steam Generator Company has established offices at 90 West street, New York City. It has control of patents and designs of C. H. Smoot, who, with L. L. Battu, has been identified for some time with the low-pressure steam turbine field through the Rateau-Battu-Smoot Company, and also with centrifugal blowing engines and high-speed, high-capacity, low-voltage direct-current machinery. The slag steam generator comprehends an equipment to utilize the heat of slag received in the molten condition, bringing the slag in intimate mixture with water (the slag being granulated as in the process for preparing slag for cement manufacture) and heating the water to such a temperature that a supply of steam is available for use in a low-pressure steam turbine. The turbine may, of course, be used for driving an electric generator or for a blower in connection with the furnace from which the slag is obtained or for other purposes. The initial installation is yet to be completed, but the capacity of the plant is predicated in part on a basis of 70 lb. of slag sufficing for one kilowatt hour of power.

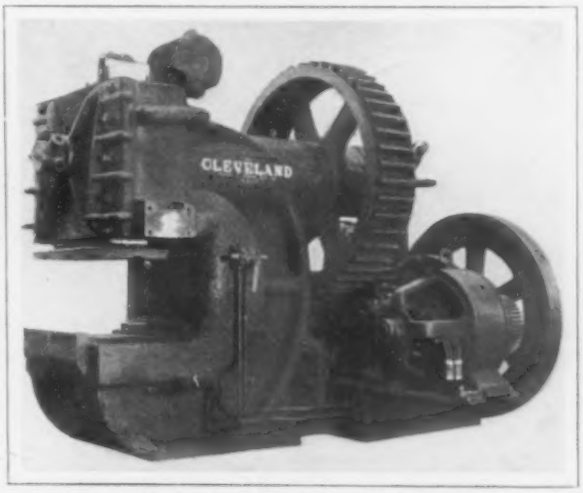
Briefly described the idea is that the stream of molten slag shall be received in a special device of cast iron forming a double funnel. Into the outer or visible funnel is poured the stream of molten slag, and from the inner, concentric funnel below it is received a supply of water under sufficient pressure to give it a high velocity. The inverted cone of water at high speed from the pressure chamber constituting the second funnel results in an intimate contact of the slag with the water and such a rapid disposal of the slag below the funnels that so far as the eye can discern there is no vapor discharged into the atmosphere. The apparatus of course requires that the chamber into which the slag is pouring and into which the cone of water is being delivered is inclosed to conserve the heat. It is an interesting fact that there is some time required, small though it is, for the transfer of heat from the slag particles to the water, with the result that explosions from any sudden evaporation of water are absent and the intimate mixture of hot molten slag with relatively cold water is thus possible.

The inclosed chamber receiving the mixture of slag and water is in communication with a storage tank, which it is desirable, other things being equal, to have large to help in maintaining the desired continuity of steam supply to the turbine; and from the storage tank the hot water reaches the evaporator, so called, with its delivery pipe to the turbine.

To get a better idea we can perhaps assume water delivered to the mixer, or funnel of water, at say 210 or 211 deg. F. The slag may be received into the apparatus at 1200 deg. For continuity of a supply of slag, a slag mixer may be installed, from which a stream of the desired size may be obtained as long as may be needed. With the chamber under the funnels designed to allow for the quick conversion of the velocity head of the water into a pressure head, together with a static head of perhaps 5 lb., water may be collected in the bottom of the chamber, say, at 235 deg. and piped at the same temperature in the storage chamber. A relief valve on the storage chamber would save the system against the possibility of any undue pressure. The 235 deg. water then reaching the evaporating chamber would supply steam at 212 deg., for example, if the consumption of the steam turbine made a sufficient demand to maintain the less pressure in the evaporator and thus utilize the heat stored in the water. Water from the bottom of the evaporator is taken by a pump for return to the conical spray first referred to, receiving on its way such a supply of make-up water as may be necessary.

A Heavy Open Gap Punching Machine

An unusually heavy open-gap punching machine was recently built by the Cleveland Punch & Shear Works Company, Cleveland, Ohio, for the Cambria Steel Company. This massive machine is of steel



A Very Massive Punching Machine of the Open Gap Type Designed for Use in the Fabrication of Splice Bars and Tie Plates

construction, bronze bushed throughout, and will be used for the fabrication of splice bars and tie plates.

The main frame is an annealed steel casting, the width across the horseshoe being 48 in. The annealed steel cover plate is double tongued and capped around the head, safeguarding this part of the frame against the severe side strains to which it will be subjected. The annealed steel main gear, which has an 18-in. face, is of 5-in. pitch and double shroud. The annealed steel intermediate gear and pinion have cut teeth of 3-in. pitch and 10-in. face. All the shafts are heat treated steel forgings. The diameter of the main shaft is 15 in. at the point of bearing and 12 in. at the clutch. Four keys transmit the load through the steel clutch to the main shaft. The diameter of the intermediate shaft is 9 in. and that of the driving shaft is 5½ in.

A novel device for operating the machine is a pneumatic clutch operated by a conveniently located valve. The clutch may be thrown in at will and on completing the revolution is withdrawn automatically. The head of the plunger is provided with pneumatic control so that it can be stopped in any desired position, which makes it a convenient centering device. For continuous operation of the machine the controlling device may be used as an emergency throw-out when material has not been properly placed on the dies.

The machine is driven by a direct-connected 40-hp. motor, which is mounted on a bracket bolted to the frame, thus making the machine entirely self-contained.

The plant of the Toledo Boiler & Tank Company, Toledo, Ohio, has been sold at public auction in the bankruptcy court to James F. Groswiler and Wilbur Owen.

An Improved Type of Chain Grate Stoker

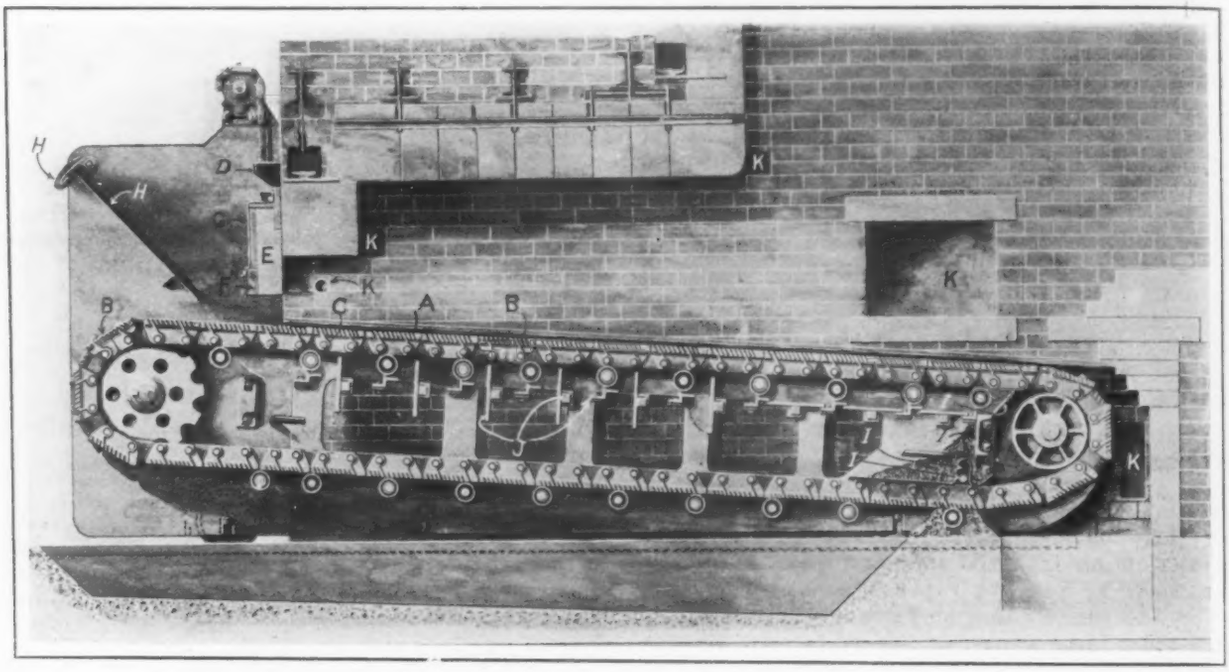
The Illinois Stoker Company, Alton, Ill., has made a number of changes in the construction of its chain grate stoker. Among the points that are of interest in the design are the use of inclined air slots, ease of repairing broken links, a number of different speeds of operation, variation in the amount of coal fed, and regulation of the air supply.

As will be noticed from the accompanying engraving, the stoker is built as a self-contained unit, which is mounted on wheels and can be moved into or out of the setting at will. The links A making up the chain of the stoker are 9 in. long, and the air slots on the opposite sides slope in different directions. This arrangement is said to offer a marked resistance to the sifting of fine coal through the grate without reducing the available air space, which in the standard links is 23 per cent. If any of these links should be broken it is possible to repair the grate easily by inserting a repair link, B, which is made in two parts, having open rod holes. The halves are slipped into place, a pin is driven through a hole cored in the head of the links, the ends of which are forced into a light depression and the damage is repaired. Cylindrical chain rods are used, the advantage of this construction being that they can turn and thus expose the entire surface to wear, while in addition the danger of the links becoming locked in a humped position is eliminated.

The chain is driven by sprockets which are keyed to the front shaft, the motion being imparted to this shaft by a driving mechanism consisting of a ratchet and pawl and worm and worm wheel. Five different speeds are available with this combination, and there is the additional advantage that any slack in the chain can be taken up by bolts at the front of the stoker, even though it may be in operation.

The amount of coal fed can be regulated by changing the driving speed, and also by raising or lowering the feed gate. There are no bolts in the entire feed gate frame D that might become rusted from moisture in the coal. To put the tile E in place it is simply necessary to slip the clip F on the end of the tile, hook the shoe G on the clip and hang the tile on the feed gate frame by the shoe. The shoe and the tile are then secured by a small tapered pin. Any repairs that may be necessary to the feed gate can be made easily by simply dropping the hopper plate H, which is held in place by a hook.

To distribute the air through the various portions of the grate the ash baffle I, located between the two strands of chain at the rear of the stoker, has been devised. These are relied upon to prevent any air leakage at places where excess air might be detrimental, and the distribution of the air supply is accomplished by movable dampers J. In this way it is possible for the stoker to operate efficiently through a range of from 50 to 250 per cent. of its normal rating. When the stoker is being operated at half of its rated capacity a sufficient number of dampers are closed to give an active grate surface which is large enough to carry the load with the most economical rate of combustion.



View of an Improved Form of Chain Grate Stoker Showing the Arrangement of the Different Members

Another feature of the stoker is a special design of arch which gives a large combustion chamber of practically uniform cross-section throughout its entire length. The front arch is short, which prevents the coal from traveling very far into the furnace before becoming ignited. The firebrick arch blocks, which have holes through them, are threaded on a pipe, hangers being placed at intervals of not more than 2 ft. By placing a number of these independently suspended sections side by side any required width of arch can be secured. Special care has been taken to provide for the ready renewal of the rear tile.

A number of inspection doors K are provided to enable the fireman to watch the condition of the furnace.

Surplus cars on July 1 were greater in number than in any year of the last five years for the same period, according to the report just issued by the American Railway Association. The total surplus was 220,875 cars, against 232,994 June 15 and 70,740 July 1, 1913. There was a sharp decrease in the number of idle box cars from 88,450 June 15 to 81,599 on July 1. The decrease in surplus flat, gondola and other kinds was not so marked.

Aims of a Scrap-Iron Organization

The Scrap Iron Division of the National Association of Waste Material Dealers has issued a 16-page pamphlet "embodying certain ideas and facts," as stated on the title page, which will be of interest to those who have not yet joined the organization. We take from the pamphlet some points which are especially worthy of reproduction as follows:

"We feel and like to emphasize the fact that the scrap-iron business is legitimate. We mean by this that there is a logical place for the scrap-iron dealer fitting between the producer and consumer. He should not be regarded as any unnecessary middleman or commission agent. He is as essential as the wholesale or retail merchant in any other line of trade. It is an old idea of some that the scrap-iron dealer buys his goods for little or nothing, when there is little demand and holds them until prices are high, thus getting exorbitant profits at the expense of both the producer and consumer. This is evidenced by some few who endeavor to do direct trading. But most consumers today realize that it is not practicable to scout around direct for their supply. The reason is obvious, i.e., by so doing they create undue competition which results in ultimately higher prices, the loss of just compensation to an honest trade and fictitious value to the producer.

"We sincerely believe that once the general public and the vast number of producers and consumers of waste materials of all kinds realize the position this trade holds in the general welfare of the community, we will find that the honest, sincere efforts made in the past will be amply rewarded.

"It is therefore our duty and aim to tone up the general morale of the trade. We intend to encourage honest dealings and to discourage dishonest and unscrupulous dealings. We believe that this association will have the effect of uplifting. Each member is a representative of the association and surely with this added responsibility he will want to conduct his affairs properly. Moreover, the association will have certain prestige and will endeavor to rectify conditions on complaint of improprieties.

"While this association was primarily formed with the intention of benefiting the dealers in waste material, and actions are to be taken which are for their good, we firmly believe this will be more easily accomplished by co-operation with the producers and consumers with whom we are constantly coming in contact. There should be no vital reason why we should be at odds with anyone from whom we buy and to whom we sell, and so we feel that when our trade is well organized we can command the respect and support of other lines of trade who in turn have their own organizations to look after their own interests more diligently. Thus it is seen that we do not intend to be at all antagonistic and we are not looking forward to any radical actions; but simply desire to have equal standing with other standard or organized lines of trade.

"Today, with tariff reductions and the natural tendency to expand one's field of activity, we can look to possible affiliation with organizations in other countries. We can get their ideas and suggestions which may be beneficial to us and, furthermore, we can probably make reciprocal arrangements with them whereby each will look after the interests of the other organization. This ought to prove very beneficial as it will tend to make foreign trade easier to do, as firms trading will feel more secure and will place more confidence in each other, which fact always makes business dealings more pleasant. Very often profitable business with foreign concerns is turned down because one has no immediate means of finding out with whom he is negotiating.

"The method of making or receiving foreign shipments, together with questions of ocean freight rates, correct packing and marking, and classification, pilferage, etc.; all this information should be obtainable through this association. And this benefit will not alone help the dealer on the seacoast, but rather the inland man who at present is not so familiar with this import and export trading.

"It should be thoroughly understood that this association is not for regulating prices on any commodity. To most dealers in waste materials the idea of regulating or setting prices is ridiculous and not considered at all feasible. A person thoroughly conversant with the scrap-iron business knows very well that existing conditions and circumstances would not permit or warrant price regulation. By serious thought, one easily sees that with the great variety of markets which extend over such a varied and extended territory and which are supplied by dealers whose operations cover a more extended area, it would be utterly impossible to regulate prices. Moreover, this association is fundamentally opposed to any such practice and we believe will stand ready to abolish any such attempt if it were instigated. There are more vital things to be accomplished."

Want of space forbids the reproduction of more of the interesting matter presented, but copies of the pamphlet may be had by addressing William S. Buxton, vice-president, 307 Atlantic avenue, Boston, Mass., or the secretary, Charles M. Haskins, 144 High street, Boston.

The June Production of Copper

The Copper Producers' Association's monthly report for June shows the stock of copper on hand July 1 to be 106,110,663 lb. As compared with a month ago, this is an increase of 21,768,022 lb., the stock on June 1 having been 84,342,641 lb. The statement of the association for June compares as follows with that for May:

	June. Pounds.	May. Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States at the first of the month	84,342,641	70,337,001
Production of marketable copper in the United States from all domestic and foreign sources in the month	141,345,571	142,308,287
Deliveries of marketable copper in the month:		
For domestic consumption	46,227,353	55,592,170
For export	73,350,196	72,710,477
Total deliveries	119,577,549	128,302,647
Stock of marketable copper of all kinds on hand at all points in the United States at the close of the month	106,110,663	84,342,641

The production in June was only 962,716 lb. less than that in May, or 141,345,571 lb., as compared with 142,308,287 lb. Total consumption for June was 119,577,549 lb., a decrease as compared with May of 8,725,098 lb., which helps to account for the large increase in stocks. The falling off in consumption was entirely in domestic deliveries, the June home consumption being 9,364,817 lb. less than in May. Foreign deliveries increased 639,719 lb. in June as compared with May.

An organization known as Associated Industries has been formed, with general offices in the White Building, Buffalo, N. Y. The president is E. J. Barcalo, Barcalo Mfg. Company; first vice-president, H. D. Miles, Buffalo Foundry & Machine Company; second vice-president, Louis Wiard, Wiard Plow Company; treasurer, Ralph Plumb, Buffalo Bolt Company; secretary, Mark A. Daly; chief inspector, Alexander Mackenzie. The membership of this body is made up of individuals, firms and corporations employing labor. It will have nothing whatever to do with the ordinary relations between employer and employee, but will endeavor to promote the welfare of its members and their employees under the new conditions which have arisen with the adoption of the workmen's compensation act. It is organized to present reasonable objections, with power behind the objections, and to support, with the same power, every good and wholesome law and rule, and to help the constituted authorities to make fair laws and rules. Copies of the constitution and bylaws can be had on application to the secretary.

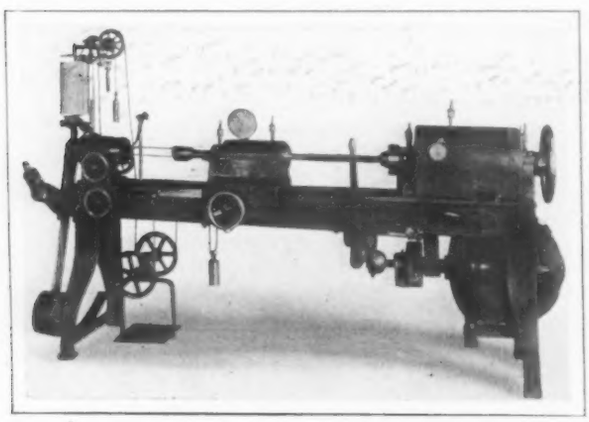
The number of companies chartered in Canada last year was 758, with a total authorized capital of $425,207,569. This compares with 933 in the previous year, with a total capital of $680,762,199.

DRILL TESTING MACHINE*

A Special Mechanism for Determining the Efficiency of Cutting Tools

BY T. Y. OLSEN

In any manufacturing plant where metal is machined there are two classes of tools used. One class comprises the fixed machines, whose quality, adaptability and use may be determined from inspection of design and construction. These tools are of a high first cost and are considered a part of the plant proper. The second class consists of cutting tools, and is small and insignificant when each tool is considered by itself. Such tools, however,



A Machine for Testing the Efficiency of Drills, Taps, Dies and Other Hand Cutting Tools

are the real expense in operation, as the efficiency and output of any machine tool, no matter how well designed, is a function of the quality and form of the cutting tool. Such tools are quickly used up and must often be renewed. Their cost is large in the long run, but comparatively small when we consider what may be gained in production by the use of a high-speed cutting tool over the ordinary cutting tool of to-day.

This second class of tools comprises tool steel, as used in lathes, shaping and planing machines, boring mills, etc.; files of all description; hack-saw blades; drills, taps, dies and reamers; milling cutters, and also emery wheels and other abrasives.

All tools of this second class are purchased to-day largely through the efforts of salesmen, and usually the sale goes either to the best salesman or to the lowest bidder. It should therefore be the object of any engineering department to specify such tests of material to be purchased, that the purchasing agent would know how to buy and be able to obtain at the lowest price material subject to test.

The cutting property and efficiency of tools has been determined in some instances, but only by the very largest users, by tests of long duration at great expense. A machine that will give this information accurately and quickly at a minimum expense has been demanded, as it is just as essential for the smaller manufacturer to know the value of his tools and what he is purchasing as it is for the larger ones.

The first tools of the above-mentioned list to be commercially tested were files, and such tools are to-day successfully tested all over the world by the Herbert file testing and indicating machine. By its use the proper cut of file for any class of material can also be determined; likewise the cutting property of metals. An attachment can also be obtained for this machine whereby hack-saw blades can be tested to destruction and curves obtained showing their quality.

The cutting property of tool steel has been determined in various ways, but until Messrs. Herbert and Fletcher, of England, devised their machine for the testing of tool steel there were no ready means whereby such quality could be determined, except by actual practice tests, which were tedious and costly. This type of machine is to-day used by some of the largest tool-steel makers and users in the world, and the results obtained are remarkable, in that they show not only the quality of the tool steel but also the speeds at which such steel, properly treated, should be run to obtain the highest efficiency. By means of this machine actual cutting conditions are assumed in a manner which produces quick, accurate results at a minimum cost. The speed can be regulated and accurately determined, so that the cutting quality at any speed is obtained. From a series of such determinations the speed curve may be formed, which indicates perfectly the characteristics of the steel.

The testing of these various tools has led to the further desire to test such tools as drills, taps, dies and reamers. A machine for this class of testing presents a far more difficult problem than either of the other machines, since in this case it is necessary to test finished tools under actual working conditions. The machine must cover all conditions as to speeds and feeds, and must measure four variables, namely, pressure, torque, penetration and number of revolutions.

The machine to cover this class of testing is known as the Olsen drill, tap and die testing machine, and was designed to meet the precise specifications of the Philadelphia Navy Yard, where such a machine has been in successful operation for some time. It was designed to test drills, etc., from the smallest up to those 1 in. in diameter. To cover this large range of drills it was necessary to provide spindle speeds of from 50 to 1000 r.p.m., as well as a hand attachment for use in testing taps, dies, reamers, etc. The feed problem resolved itself into two types: that of gravity or dead weight, and a positive feed.

The pressure measured is that which is exerted by the point of the drill on the material. It should be accurately obtained and in such a manner that it may be read off from an automatically recording dial at any time during the test. The torque, which is the measure of the resistance to cutting, should, for accuracy, be measured by dead weight. This measurement must also be arranged so it will distinguish with equal degrees of sensitiveness the variations in small as well as large drills. The penetration is the measure of the depth of bore, taken directly from the motion of the cutting tool into the test material. The number of revolutions required to give a certain penetration is also determined.

The machine consists of a bed on which a weighing head is mounted at one end, which holds the material to be cut. At the other end is mounted a driving head with an arrangement for changing speeds and positive feeds, etc. Between these two heads is a carriage mounted on ball bearing rollers, supporting the spindle which carries the drills, etc., to be tested. The weighing head is bolted securely to the frame and in this head a pendulum, which measures the torque, is mounted in ball bearings. The pendulum is so arranged that by changing weights on it a maximum capacity of either 100,

*A paper substantially in full, presented at the seventeenth annual meeting of the American Society for Testing Materials, held at Atlantic City, N. J., June 30 to July 3, 1914.

1000 or 2000 in.-lb. is secured. The moment or torque may be read from a direct reading, uniformly marked scale at any time during the test. Above the pendulum is mounted a large drum which by its rotation accurately records the torque on equally spaced cross-section paper and to a largely magnified scale. To dampen the action of the pendulum an air piston is provided, which can be adjusted to suit requirements. Also, in cases where the drill may run temporarily above capacity or for some reason becomes stuck for an instant, the excess torque to an amount of 3000 in.-lb. can be measured on an additional scale.

The operating head rotates the spindle and is fitted with a change gear mechanism and adjustable-speed motor drive, so that by one lever change any speed and motor control between 50 and 1000 r.p.m. can be obtained. In this head is located the positive feed mechanism, which can be thrown in or out of operation by a small lever, controlling a split taper nut on the spindle. This nut is given a rotation a fraction slower than the spindle speed, causing it to advance in proportion to the retarding of the nut. If both were to run at the same speed there would be no feed. The changes of feed are thus quickly made by shifting a sliding gear as indicated in the gear head, and a feed of either 0.01, 0.02, 0.03, 0.04 or 0.05 in. per revolution can be obtained.

The spindle is of vanadium steel and operates through a carriage as shown, which is free to move on the bed. In this carriage is mounted the dial indicator, which measures through the action of a hydraulic diaphragm the pressure on the point of the drill. The pressure is measured directly and automatically up to 5000 lb. In a more recently built machine of this type the pressure indicator has been mounted on the weighing head, where it is more directly under the eye of the operator, while testing.

The carriage is also mounted, as noted above, on ball bearing rollers, and through it the gravity feed may be applied by adding standard weights to the scale pan as shown. A scale attached to the carriage indicates the actual penetration of the drill. The penetration may also be noted by the motion of a pencil on the rotating recording drum, thus giving the relation between torque and penetration.

The number of revolutions of the spindle may be noted on the dial in the gear head, or its relation to the torque automatically recorded on the autographic chart. A curve may also be obtained showing the relation between penetration and number of revolutions, so that the machine will show graphically the relation between any two of the variables, torque, penetration and number of revolutions.

Both the weighing and power heads are arranged so that standard chucks can be used. The drills are usually placed in the power head and the material to be bored in the weighing head. In the case of die testing, however, the die is placed in the weighing head and the bar to be threaded in the power head, and thus the bar, which may be of considerable length, can pass through the hollow spindle of the weighing head.

Ball bearings, both thrust and radial, are used throughout the machine. The bed is fitted with a trough and pump, and piping is provided so that any desired cutting compounds can be applied at the point of the drill and circulated, thus also affording a means of testing various kinds of such compounds.

In this machine every point has been considered so far as possible, so that any test can be made in which the cutting effort is concentric with the center of rotation cutting from a center. In addition to testing the cutting property of tools, it can also be used for determining the cutting property of steel and metals, the holding power of drill chucks, etc., and even for small autographic torsion tests.

Mechanical Engineering at 1915 Engineering Congress

A list of topics to be treated in the section of mechanical engineering of the International Engineering Congress to be held in San Francisco in 1915 is given as follows in the last issue of the journal of the American Society of Mechanical Engineers.

Recent progress and present status of foundry practice, and casting metals.
Recent progress and present status of the art of forging.
Equipment processes, and methods for the boiler shop.
Machine-shop equipment, methods, and processes.
Automatics.
Special processes for shaping and forming metals.
High temperature flames in metal working.
Industrial management.
Safety engineering.
Industrial museums as an educational factor.
The steam engine of the year 1915.
The steam turbine of the year 1915.
The internal combustion engine of the year 1915.
Motors of the Diesel type.
The Humphreys gas pump.
The steam boiler of the year 1915.
Refrigeration.
Pneumatics.
Lubrication and lubricants.
Water wheels of pressure type.
Water wheels of impulse type.
Hydraulic power developments and use.
Power-plant design.
Motor vehicles, passenger type.
Motor vehicles, utility type.
Motor tractors.

It appears that at this early date enrollments and subscriptions for participation in the congress have been received from 42 foreign countries, and that of the present total enrollment 25 per cent. is from countries other than the United States. Active interest has not yet been shown by engineers in this country to the extent expected, but it may be that the distance of the congress in point of time is altogether accountable.

Portsmouth Iron

The Portsmouth Steel Company, Portsmouth, Ohio, has issued a 32-page illustrated brochure dealing with its special product to which the name of Portsmouth Iron has been given. This iron, the pamphlet says, is a homogeneous, workable, pure metal, being one of the first products of its kind developed from the modern open-hearth furnace, and has proved itself successful as a hardy resistant to rust and the more destructive agents of corrosion. Portsmouth Iron contains a small quantity of copper, which, it is stated, has been properly placed to insure imperviousness to the usually destructive factors and furnishes sufficient softness, toughness and ductility for the manufacture of every metal product that is to be exposed to the weather. It is claimed that Portsmouth Iron excels even Swedish or charcoal irons in resisting the soluble action of diluted sulphuric acid. The illustrations given show how this iron is used in the manufacture of a great variety of products.

Charles T. Schoen, formerly head of the Pressed Steel Car Company, is stated to be preparing to erect a plant at Leeds, Eng., for the manufacture of steel cars. He is understood to be negotiating, in this country, for the machinery required.

The Canadian Locomotive Company, Kingston, Ont., has placed a contract with the Canada Foundry Company, Toronto, for gray-iron castings for 10 locomotives.

Internal Transverse Fissures in Axles*

An Instance Where a Failure Was Due to Such Defects Brought About by Improper Heat Treatment

BY ROBERT JOB†

The type of failure known as "internal transverse fissure" has been carefully studied, particularly in connection with rails which have failed in service, and much evidence has been collected as to the prime cause or causes of the defect, as well as to the method of its development.

Dormus in his studies of these fissures about 15 years ago, upon Austrian low-carbon, Bessemer rails—0.20 to 0.40 per cent. carbon—reached the conclusion that they were produced either in the mill itself, or subsequently in service, but only in unsound steel. In this country these failures have been found heretofore, as far as we are aware, after the steel has been in service.

In view of the importance and the dangerous character of this type of failure, we have taken especial interest in the study of a 10-in. driving axle which recently came under our observation. The axle in question was of plain carbon steel, annealed, and said to have had no subsequent heat treatment. It was received in a shipment direct from the manufacturers and had never been in service. Upon receipt at the shops, while a cut was being removed in a lathe prior to mounting, the axle broke in two at a point about 20 in. from the end. The appearance of the fracture was peculiar, showing a band of bright, clean, unoxidized metal around the circumference of the axle and extending about 1 in. toward the center. Inside of this band the surface of the metal was discolored and oxidized. This oxidized condition did not extend into the steel longitudinally, excepting as mentioned below, but was simply an oxidized transverse crack or fissure which extended over the inner portion of the fractured area.

The surface of the transverse crack was rough and irregular, and two longitudinal fissures were found, one across the center of the axle and the other about 1½ in. from the circumference. The appearance of the fractured surface is shown in Fig. 1, the six round holes indicating the locations from which borings were taken for analysis, from the inside and from the outside portions, respectively. The analyses are as follows:

	Outside	Inside
Carbon, per cent	0.48	0.47
Phosphorus, per cent	0.022	0.019
Manganese, per cent	0.46	0.46
Sulphur, per cent	0.036	0.031
Silicon, per cent	0.142	0.161

The chemical composition, outside and inside, is closely alike and is within the usual limits, and does not indicate the cause of failure, and the fact that the proportion of silicon is moderate indicates that no excessive amount of slag was present, although slag inclusions were found.

Test specimens were cut longitudinally from the axle, one from the bright outside portion close to the surface, and one from the oxidized portion about half way between center and circumference. The results of the tension tests are as follows:

	Outside	Inside
Tensile strength, lb. per sq. in.	92,340	76,030
Elastic limit, lb. per sq. in.	54,080	45,410
Elongation in 2 in., per cent	14.5	5.5
Reduction of area, per cent	29.6	12.3

In the outside portion it will be noted that the elongation and the reduction of area of the metal are below normal, while in the inside portion the results indicate radically defective material.

Microscopic examination was made from sections cut from the above test specimens with results shown in Figs. 2 and 3, at 50 diameters. From these photomicrographs it will be noted that the size of grain in the outside portion of the axle was coarser than that in the inside portion, and that the size in the inside portion was fairly fine, indicating a proper annealing temperature at that point. A

*From a paper presented at the seventeenth annual convention of the American Society for Testing Materials, Atlantic City, June 30 to July 3.

†Milton Hersey Company, Ltd., Montreal, Canada.

Fig. 1—Fractured Surface of Axle Showing Oxidized Internal Transverse Fissure with Bright Metal Around the Outside

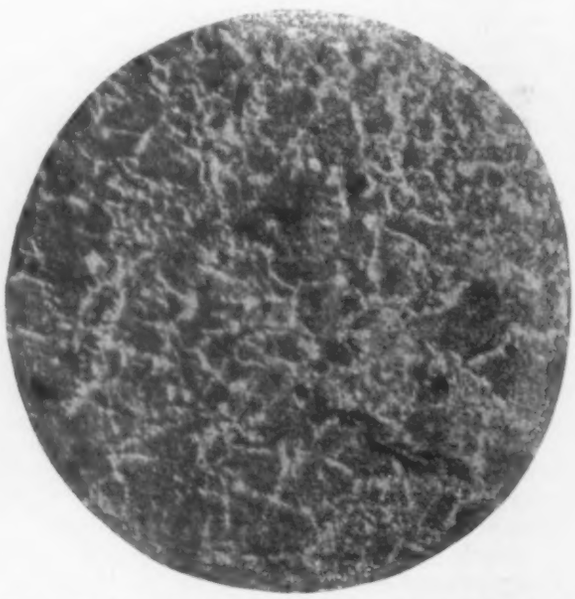


Fig. 2—Bright Outside Portion about ½ In. from the Surface, Polished and Etched with Iodine

slag inclusion is shown in each of the photomicrographs.

We next cut a transverse section from the axle close to the point of fracture, and on polishing and etching with iodine we obtained the result shown in Fig. 4. In this we found that one side of the axle—

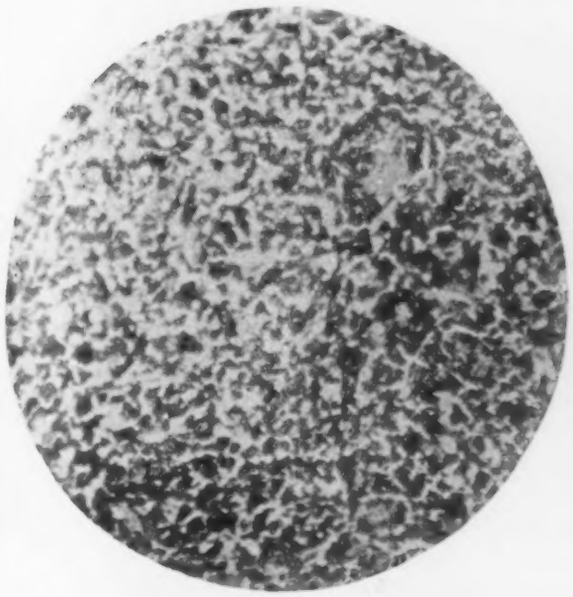


Fig. 3—Inside Oxidized Portion, Midway Between the Center and Circumference, Polished and Etched with Iodine

Fig. 4—Transverse Section 1 In. from Fracture, Polished and Etched with Iodine

the upper part in the figure—was coarse-grained, and a photograph at 2 diameters of this upper portion is shown in Fig. 5. Fig. 6 is a photograph at 2 diameters taken at the center of the axle, and shows the line of one of the longitudinal fissures, and the fine-grained structure, while Fig. 7, also at 2 diameters, shows the condition in the lower part of Fig. 4 at the side opposite Fig. 5 and at about the same distance from the circumference as the latter. The granular size is fairly fine, and the gradual coarsening near the surface of the axle is shown. The steel throughout the section was rather porous and contained occasional small cavities and slag inclusions. Fig. 8, a photograph at 50 diameters, represents the condition at one of these locations.

Upon study of the sections shown above, several facts are indicated. In the first place the relatively coarser grain upon the outside surface around the entire circumference than inside proves that the temperature of the annealing furnace was higher than necessary to produce the best results, and in consequence, by the time that the refining temperature had penetrated to the center of the axle, obliterating the original coarse granular form, the steel upon the outside portion had been overheated, causing increased granular size, and resulting in a lower elongation and reduction of area than would have occurred otherwise. This condition, therefore, simply means that the annealing temperature was not properly controlled; in other words, it is evidence of lack of careful mill practice.

Second, the fact that the size of grain is decidedly larger upon one side of the axle than upon the other proves that the temperature upon the one side was decidedly higher than that upon the other. This condition could be produced by use of an unevenly heated annealing furnace, or it would also result provided the axles in the charge after annealing had been cooled unequally in any manner, as, for example, by opening the door of the furnace in the winter and exposing the adjacent steel to the cold air, thus chilling the side exposed to the cold, while the temperature of the other side was kept up by the other red-hot axles, and by the heat of the furnace. The same condition could also occur if a charge of axles was removed from the annealing furnace when at or above a red heat and allowed to remain piled together in some location where the outside portion was exposed to cold. The effect would be to chill the side of an axle exposed to water or to cold air, while the other side of the axle in contact with or adjacent to other red-hot axles might easily be maintained for a considerable time at a temperature above the critical point of the steel.

Under these conditions a decided variation in the size of the grain upon the opposite sides of the axles so exposed could easily result, and owing to the difference in relative rates of contraction severe torsional strains would be induced which might easily cause rupture of the metal and produce a transverse crack such as is shown in Fig. 1, as well as the longitudinal cracks. The fact that the surface of the transverse fissure was oxidized is easily explained by the presence of the longitudinal cracks, one or both of which evidently extended to the surface of the axle and thus admitted air or moisture to the heated surface of the fissure.

The fact that the steel was porous in spots and contained slag inclusions is merely an indication of insufficient cropping to get to sound metal—in other words, defective mill practice; and such condition would naturally result in weakness in the steel and

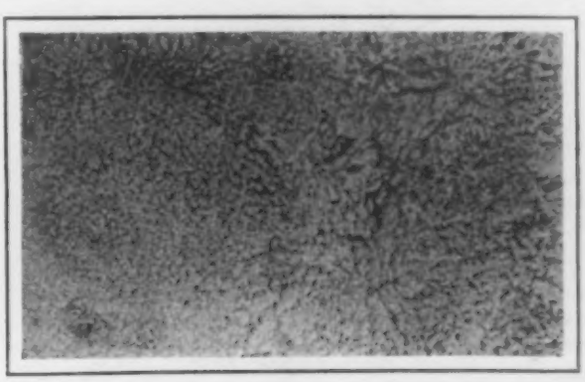


Fig. 5—Upper Outside Portion of Axle (Fig. 4) Showing Coarse Grain Near the Surface (2 Dia.)

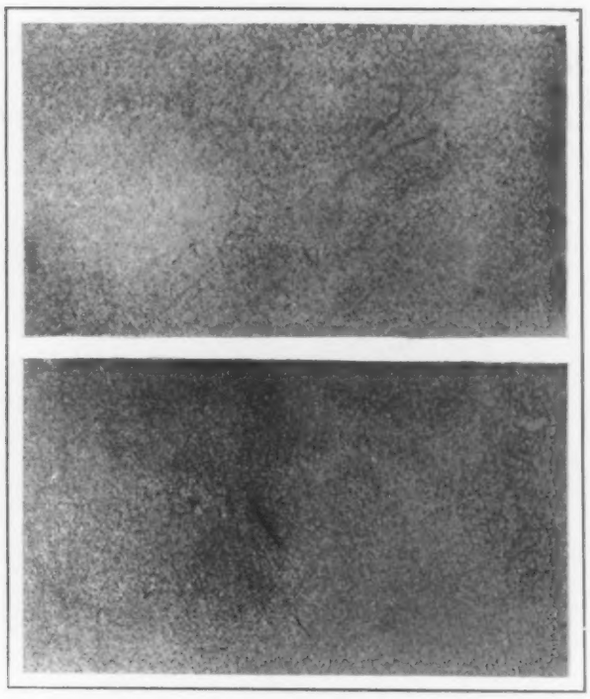


Fig. 6—Center of Axle (Fig. 4), Fine Grain and Longitudinal Fissure (2 Dia.)
Fig. 7—Lower Portion of Axle Near Surface (Fig. 4), Showing Fine Grain Except Near the Surface

would thus lessen the force necessary to rupture the metal and to produce fissures. The relative weakness and brittleness of the interior portion as shown by the tensile properties is fully accounted for partly by the evident lack of proper cropping at the mill and partly by the intense strains to which the metal had been subjected.

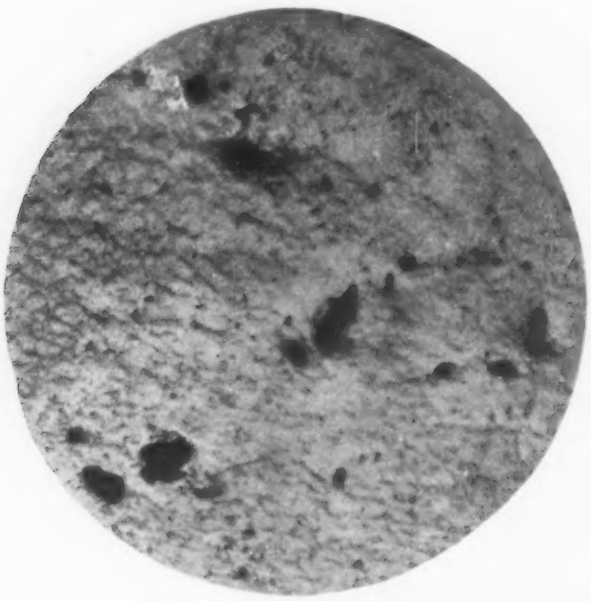


Fig. 8—Porous Steel

The study taken as a whole is of interest, since it proves that an internal transverse fissure may be produced in metal in the mill and as a result of severe stresses induced by defective mill practice.

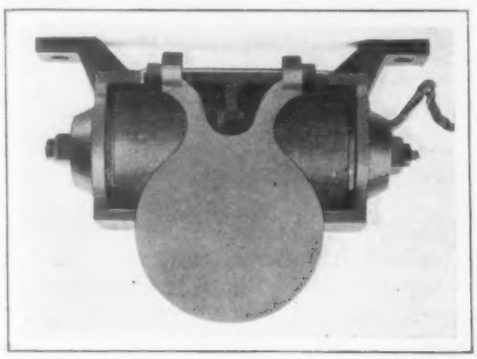
The Home Secretary of Great Britain announces that in accordance with recent factory regulations, the process of casting iron or steel is a dangerous one. He therefore proposes to make regulations applying to all plants where such work is carried on. These new rules are not to apply to the casting of pig iron from blast furnaces or to the casting of steel ingots.

An Electric Molding Machine Vibrator

An electric vibrator for rapping patterns has been placed in the market by the International Electric Tool Company, Fourth and Windlake avenues, Milwaukee, Wis. This device has no moving electrical contact or connections except the switch used to start and stop it.

As will be noted from the accompanying illustration, the construction of the device is simple and compact, consisting of two solenoids mounted in a steel frame. In the center of the solenoid is a steel plunger that moves back and forth at a high rate of speed and strikes sharp blows at the ends of the steel frame. The diameter of the plunger is a trifle smaller than that of the opening of the solenoids, which are alternately and automatically energized and de-energized by direct current.

The vibrators are made in several sizes for molding machine, bench and plate work, and the amount of power consumed by them is said to be less than one-tenth of that required by pneumatic vibrators. In addition to this there is a decrease in the amount of power required, and leaks in pipes



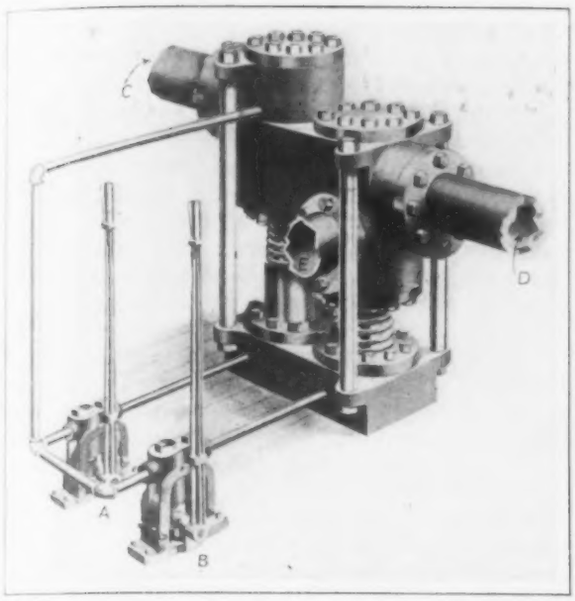
A New Type of Vibrator for Pattern Rapping Which Consists of Two Solenoids and Is Operated by Electricity

and hose, water in the machines, etc., are eliminated. The bench and molding machine types are made with a switch operated by a knee plate directly attached to the vibrator or with the switch mounted separately. The plate type is arranged to be operated by a separate switch with knee plate, or with a lever for hand or mechanical control.

Pilot Operated Hydraulic Press Valve

For operating high-pressure hydraulic presses requiring a very large volume of water the Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, has designed a hydraulic three-way pilot operated poppet operating valve. The valve is controlled by two small pilot valves, which can be located in the most convenient position.

The main operating valve can be located under the press adjacent to the cylinder and out of sight, while the operating valves A and B are located at any convenient place on the floor. These valves are required on account of the large area of the main valve openings. There are three openings in the main valve, one C from the pump, the second D to the press and the third E forms the return line to the tank and also passes through the two small pilot valves. The body of the valve is of steel and is designed for a pressure of 5000 lb. per sq. in. and upwards. There are double checks and flanged connections, special gun metal bronze being used in constructing the valve seats and checks. The operating cylinder, glands and rams are of cast steel.



A Pilot Operated Poppet Operating Valve for High-Pressure Hydraulic Presses

In the illustration the levers controlling the pilot valves are shown in the neutral position. Either of these valves can be used to control the operation of a hydraulic press, which requires a medium amount of pressure. There are three openings, two checks and three positions for each of these valves. In the accompanying illustration both levers are shown in the neutral position. By moving the lever over the valve A to the left and the other lever to the right pressure is applied to the press. With both levers at the right the pressure is held on the press, the line and the pump, while moving the lever A to the right and the lever B to the left the pressure is relieved from the press, but is maintained on the pump and the line. With both levers in the right-hand position the pressure is relieved from both the press and the pump.

When the valves are used singly to control the operation of a hydraulic press requiring a small amount of pressure, the pressure is kept on the pressure line and the return line from the press is closed with the valve in the neutral position. Moving the lever to the right applies pressure to the press and closes the return line. While the lever is at the left the opening from the pressure line is closed, the pressure is held on the line and the press cylinder is open to the return line. This type of pilot valve can be used where the pressure is to be kept on the line, but not where the pump is to run free while the pressure is held on the press.

Foreign Trade Council Organized

For the purpose of co-ordinating the foreign trade activities of the nation in an aggressive and systematic extension of American oversea commerce, Alba B. Johnson, president of the National Foreign Trade Convention, held at Washington, May 27 and 28, has announced the personnel of the Foreign Trade Council, created by resolution of the several hundred delegates from all parts of the United States who attended that conference. James A. Farrell, president United States Steel Corporation, is named as the chairman, and all sections of the country, and practically all branches of industry, commerce, transportation and finance are represented among the members, the full list being as follows:

Sam D. Capen, president Business Men's League, St. Louis; J. A. G. Carson, vice-president Savannah Board of Trade, Savannah; E. A. S. Clarke, president Lackawanna Steel Company, New York; Walter L. Clark, vice-president Niles-Bement-Pond Company, New York; Samuel Colt, president United States Rubber Company, Providence; Maurice Coster, foreign manager Westinghouse Electric & Mfg. Company, New York; Robert Dollar, president Robert Dollar Steamship Company, San Francisco; James A. Farrell, president United States Steel Corporation, New York; John F. Fitzgerald, chairman foreign trade committee, Boston Chamber of Commerce; P. A. S. Franklin, vice-president International Mercantile Marine, New York; Lloyd C. Griscom, New York; Fairfax Harrison, president Southern Railway Company, Washington, D. C.; H. G. Herget, president Illinois Manufacturers' Association, Chicago; James J. Hill, chairman Great Northern Railway, St. Paul; E. N. Hurley, president Hurley Machine Company, Chicago; Charles E. Jennings, president American Manufacturers Export Association, New York; Alba B. Johnson, president Baldwin Locomotive Works, Philadelphia; D. W. Kempner, Galveston Cotton Exchange, Galveston; Cyrus H. McCormick, president International Harvester Corporation, Chicago; Barton Meyers, president Chamber of Commerce, Norfolk; Charles H. Muchnic, foreign manager American Locomotive Company, New York; A. H. Mulliken, Jr., president Pettibone-Mulliken Company, Chicago; M. A. Oudin, foreign manager General Electric Company, Schenectady; William Pigott, vice-president Seattle Car & Foundry Company, Seattle; George M. Reynolds, president First National Bank, Chicago; Welding Ring, former president New York Produce Exchange; John D. Ryan, president Amalgamated Copper Company, New York; W. L. Saunders, president Ingersoll-Rand Company, New York; Charles A. Schieren, Jr., president Charles A. Schieren Company, New York; W. D. Simmons, president Simmons Hardware Company, St. Louis; Ellison A. Smyth, president Pelzer Cotton Mills, Greenville, S. C.; Willard Straight, president American Asiatic Association, New York; Stewart K. Taylor, Mobile Chamber of Commerce, Mobile; E. P. Thomas, president United States Steel Products Company, New York; F. A. Vanderlip, president National City Bank, New York.

Robert H. Patchin, formerly Washington correspondent of the New York Herald, has been appointed secretary of the council. The temporary offices are at 71 Broadway, New York.

The National Foreign Trade Convention at Washington, which was attended by 341 delegates, representing 72 manufacturers' associations, chambers of commerce and other commercial and industrial organizations showed that American manufacturers, merchants, railroad and shipping interests earnestly desire a more systematic development of the foreign trade, through creation of a merchant marine, establishment of American banks abroad and governmental co-operation in foreign trade. The convention unanimously adopted a resolution declaring that "the development of the United States makes it essential to the best interests of the nation that the government and the industrial, commercial, transportation and financial interests should co-operate in an endeavor to extend our foreign trade." This will be the purpose of the National Foreign Trade Council. Greater prosperity through greater foreign trade is the basic principle of the movement.

The first meeting will be held in New York in the early fall and one of the first official actions will be the appointment of a committee to co-operate with a committee of the Chamber of Commerce of the United States of America. The council will seek information and advice from manufacturers' associations and commercial organizations throughout the country. One of its most important duties will be the calling of and preparation for another national foreign trade convention in Washington in the early part of 1915, at which the systematic and practical discussion of foreign trade problems will be continued.

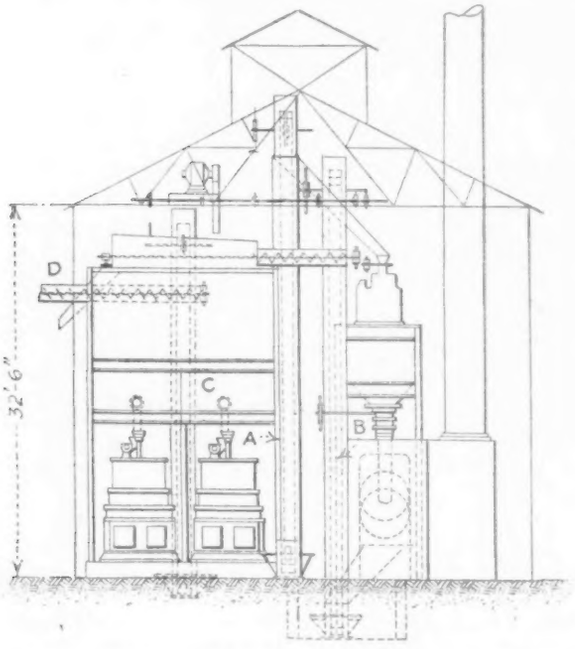
It is sought to arouse effective interest not only on the part of those directly engaged in export trade, such as manufacturers and trading houses, but likewise the agricultural, railroad and financial interests which benefit from stable maintenance of the nation's credit in international commerce.

A 1200-ton mixer was recently constructed by the Berlin-Anhaltischen Maschinenbau Company for a French steel works. The mixer reservoir is 45 ft. in extreme length and 20½ ft. in diameter, with the internal diameter 16¼ ft. The lining is magnesite with a core of fireclay and is of the roller tilting type, with ports at opposite ends for the products of combustion. The mixer is heated with coke oven and blast furnace gases, mixed with hot air.

BURNING PULVERIZED COAL*

The Underlying Principles Which Control the Process—Machinery Needed

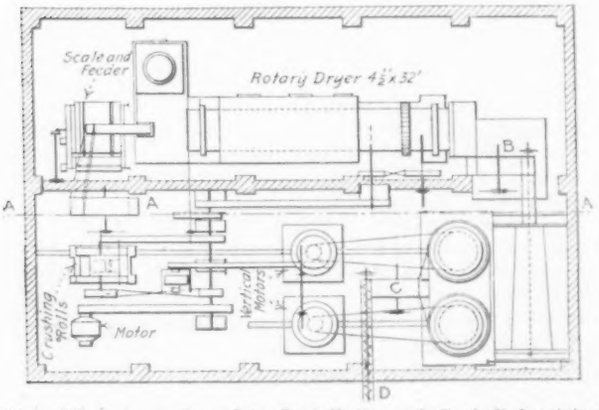
The process of burning powdered coal has been developed in but few arts, and only in relation to certain types of furnaces. For more than 30 years various schemes for burning powdered coal in



Elevation Showing Dryer and Mill

boiler furnaces have been suggested and numerous patents have been taken out on various processes and burners, but without any marked degree of success. In the Portland cement industry commercial success was attained more than 15 years ago as a result of a series of investigations and experiments. The furnace employed had much to do with the practical success which was finally attained.

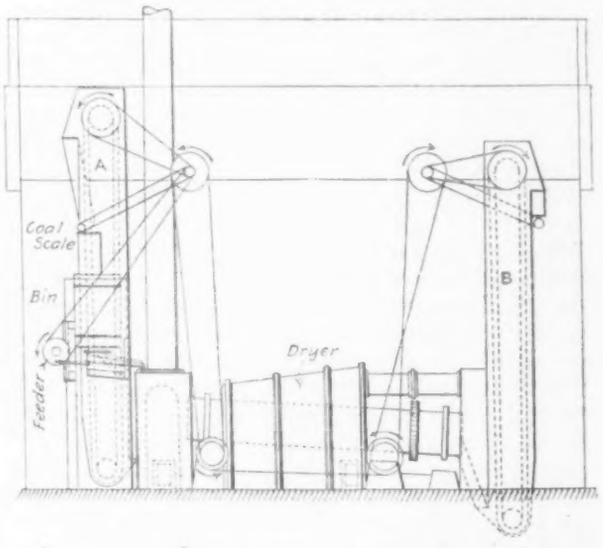
I present a set of drawings which show a complete installation of coal pulverizing machinery having a capacity of about 8 tons per hr. These drawings I have selected as illustrating simply and completely the machinery needed for a coal pulverizing equipment. They were prepared by the Le-



Plan View of a Complete Installation of Coal Pulverizing Machinery

high Car Wheel & Axle Works and are submitted by permission. By reference to these drawings it will be noticed that machinery is provided for crushing the coal in crushing rolls, elevating the crushed material in a dustproof elevator, A, to the top of the mill, where it discharges by gravity through a coal scale and then into the upper end of a rotary dryer. The coal passes through the dryer which removes the moisture, then it is discharged into a dustproof elevator, B, and raised to a hight sufficient to fall by gravity into the storage bin for dried coal located at a higher level than the pulverizing mills. From these storage bins the coal is drawn by gravity into the pulverizing mills. The pulverized coal is then raised by a dustproof elevator, C, to a point where it is discharged into a screw conveyor, D, leading to the storage bins near the kilns. The drawings show the various machines as driven by electric motors, which is customary in the art. The rotary dryer is of the general type and has a rotary cylinder 4 ft. 6 in. in diameter by 32 ft. in length.

The powdered fuel problem is one of combustion under peculiar conditions. The burning of pulverized coal differs from the burning of solid fuel, from a theoretical standpoint, principally in one particular. In the combustion of coal of commercial sizes lying on the grate, the air for combustion passes between the pieces of coal and the products of combustion pass off in the flues. Coal dust does not burn under such conditions, as the particles are so fine that sufficient air for combustion does not reach the coal through the crevices between the particles. To burn powdered coal successfully, it must be burned while in suspension in the air.

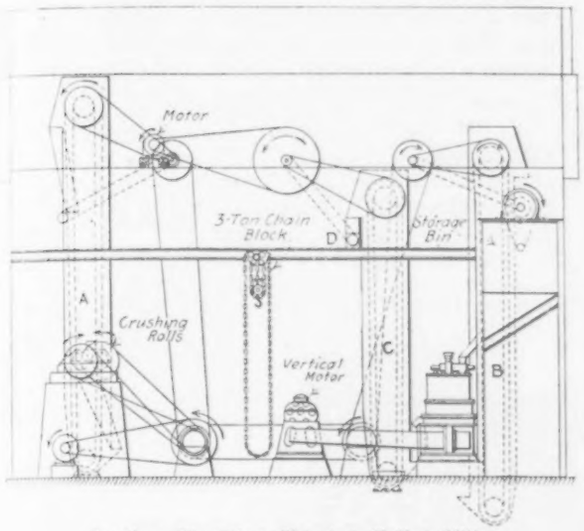


Sectional Elevation Along A-A

In such a position each particle is surrounded by air which supports the combustion. The form of the furnace used in the Portland cement art is favorable for combustion in suspension since it is very long and affords plenty of room for such combustion. Contact of the particles of coal dust with other bodies results generally in the lowering of temperature to such an extent as to make combustion impossible. The result is the virtual loss of any fuel which falls down on the lining or on the clinker. The time of combustion is evidently increased as the size of the dust particle is increased, from which it follows that the finer the grinding, everything else being equal, the quicker and more perfect the combustion. In the early days of the development of the process of coal burning, ignorance of the necessity of fine grinding was the cause of many failures in burning coal dust. In the cement industry special devices for regulating the

*From a paper presented at the recent spring meeting of the American Society of Mechanical Engineers, by Prof. R. C. Carpenter, Sibley College, Cornell University, Ithaca, N. Y.

supply of air for injecting the fuel are supplied, but no special controlling apparatus is supplied for the air which enters the kiln through the various openings around the hood. It would be difficult, indeed,



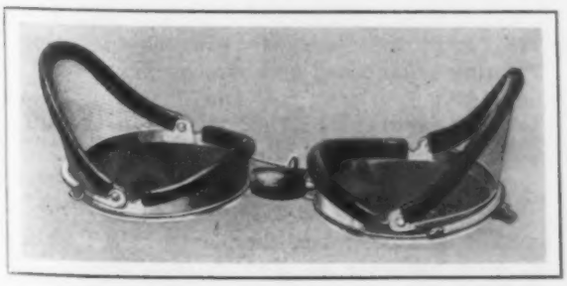
Another Elevation Showing Fuller Mills

to control the admission of such air. By increasing the fuel charge, it is possible to bring the air supply down to nearly theoretical, or to any relative proportion desired. I have found from tests in the cement art that best results are obtained when there is a slight deficiency rather than an excess of air. This is denoted by a short carbon monoxide flame at the base of the stack and also by analysis of the escaping gases.

The weight of pulverized coal required per barrel varies somewhat with the character of the kiln and the character of the process. In the dry process of manufacture the weight of fuel per barrel varies from about 22 to 26 per cent. of the weight of cement produced—i. e., from 83 to 100 lb. of coal per barrel. In the wet process the coal varies from about 35 to 50 per cent. of the finished product—i. e., from 133 to 190 lb. of coal per barrel. The theoretical amount of coal required, neglecting the heat due to the formation of silicates of lime and alumina, is probably not far from 30 lb. per barrel, provided 10,000 B.t.u. per lb. of coal is utilized. The continuous stationary kilns are reported as consuming 12 to 16 per cent. of fuel, or from 45 to 60 lb. per barrel of cement.

Safety Goggles for Hot Conditions

It is said that an inch doesn't always count for so much unless it is added to the length of one's nose. Almost equally humiliating would be an inch added to the pupillary distance between your eyes. The average is 2⅜ in., and no leather goggle is made today of any practical use that has a smaller width than 3⅜ in. As a consequence a great proportion of one's field is cut off at the most important point, namely the angles over the bridge of the nose. There is no way of lessening the width of such goggles as there must be an aperture to allow room for the nose, and as the cups that hold the lenses come right to the edge of the leather, all the space is economized. We must therefore turn to some other type of goggle. With these words of F. W. King, of the F. W. King Optical Company, Cleveland, for an introduction, an improved safety goggle brought out by the company is here illustrated.



Safety Goggles for Protecting the Skin When Used in Hot Places and Capable of Being Disinfected

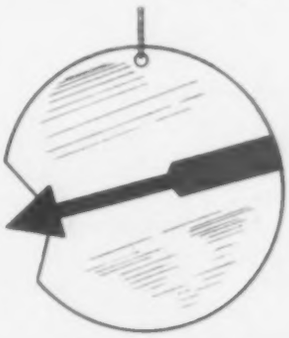
The point is made that metal with correct construction insures a perfect fit with the maximum size of field, but that no all-metal goggle can be used in its original form as it becomes too hot where there are conditions of much heat. The type shown is made with a composition padding around the cups, nose piece and screens, so that no metal comes into contact with the skin. It is especially adapted for heavy oxy-acetylene welding or cutting, for lap welding and for use around the blast furnaces. It may be disinfected, it is stated, without injury to any part.

AN IMPROVED DANGER SIGN

The Use of a Notched Disk to Make the Arrow More Noticeable a Feature

BY JAMES E. COOLEY

One of the important things that have come into use in the work for safety are the different colored danger signs, which are now used by many industrial concerns. They are made in the form of a disk and are hung up by a cord or tacked up in places of danger. The disk is made of any thin material, such as tin, sheet iron, or even cardboard, and as a rule one color predominates wherever they are used, red being the one most generally employed. No inscriptions are placed on the signs, which were originated as a warning signal for workmen unable to read.



An Improved Form of Danger Sign in Which Portions of the Disk Are Cut Away to Make the Arrow More Easily Noticed

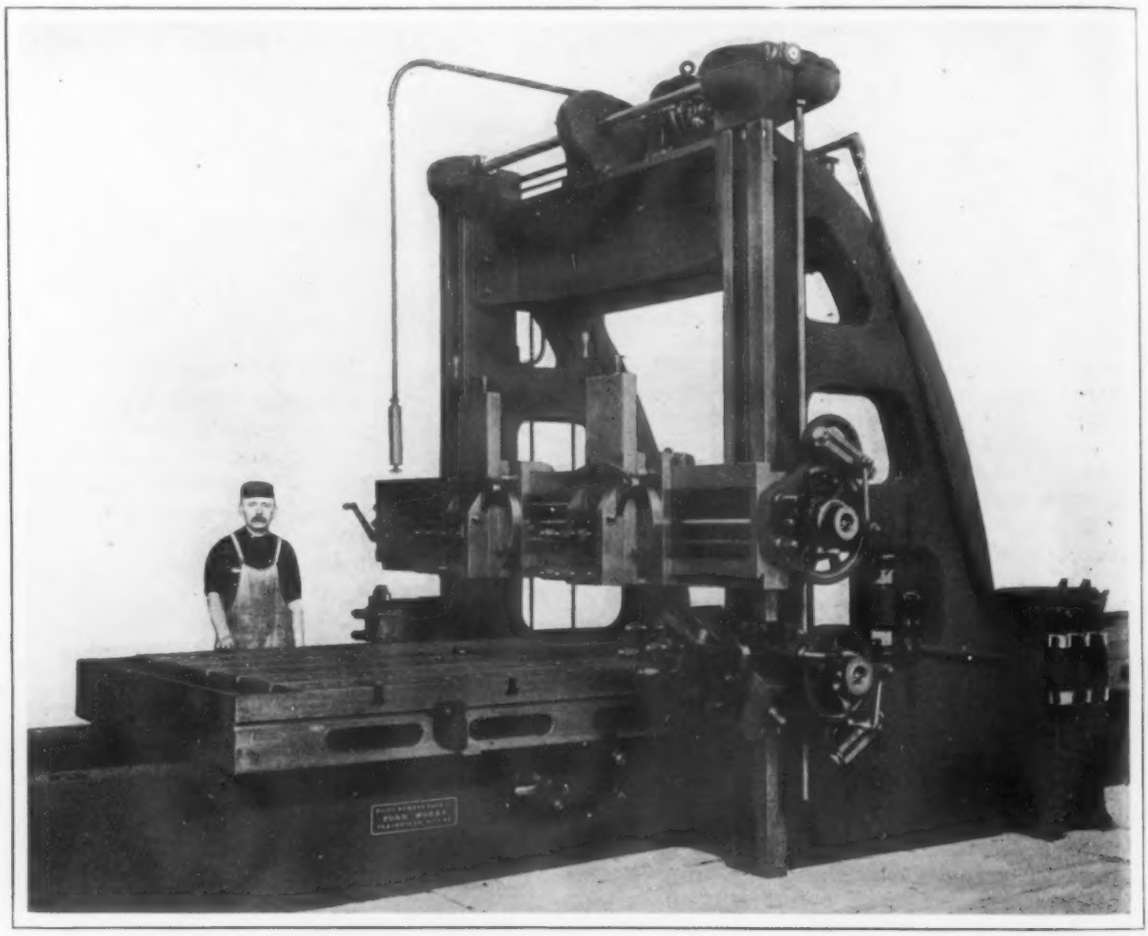
Frequently these signs are put up in places where some doubt might exist as to what the danger to be avoided really is and where it is. A rather novel danger sign, which indicates positively where the danger is, is shown in the accompanying illustration. As will be noticed, an arrow of liberal proportions is painted across the center of the sign, and on each side of the arrowhead sections are cut away, the object being to make the head of the arrow more readily noticeable. This sign can be set up and turned so that the arrow, which should be made on both sides of the disk, will point in any direction, upward, downward or diagonally. When the sign is properly placed the point of the arrow will demonstrate clearly where the danger is.

The E. J. Woodison Company has found that its proposed location at 378 Ellicott Square Building, Buffalo, N. Y., is not adapted to its use as an office and has installed a thoroughly equipped office and warehouse in connection therewith in the Thomas Power Building, 1200 Niagara street, Buffalo. The company's headquarters are in Detroit, Mich. It deals in firebrick, foundry requisites and platers' and polishers' supplies.

Motor-Driven Feed Planing Machine

The Niles-Bement-Pond Company, 111 Broadway, New York City, has recently completed a 72-in. planing machine, equipped with electric feed and power traverse for all heads. The machine is equipped with the builder's standard reversing motor drive, and this in combination with the special type of feed used, has eliminated all belts, pulleys, etc., as well as the feed box. A wide range of cutting and return speeds are provided, as well as a number of feed changes for each of the heads.

As will be noted from the accompanying engraving, the table is of heavy and very deep box section without openings through the bottom wall.



A 72-In. Planing Machine Equipped with Reversing Motor Drive and Motor-Driven Feed and Power Traverse for All Four Heads

This provides a rigid construction and at the same time chips or cutting fluid are prevented from reaching the gears or tracks in the bed.

The most noticeable feature of this machine is the electric feed and rapid power traverse which is provided for all of the heads. A separate motor mounted on the arch operates both the feed and the traverse, as well as elevating and lowering the cross rail. To prevent accidental engagement of two functions simultaneously the mechanism for the different operations is interlocked. The amount and direction of the feeds for the cross rail heads can be changed at each end of the rail, while the changes for the side heads are made in a similar way, the rates for each head being entirely independent of the other and also of the cross rail heads. A hand adjustment by a ratchet crank wrench, which is mounted on and moves with the sidehead, is provided. Graduated swivels and micrometers are provided for the feed screws of all the heads.

The driving motor is directly connected to the first driving gear shaft at the rear of the machine, thus giving the operator free access to the entire control at the front. The wide range of cutting and return feeds, which can be varied independently of each other while the machine is running, is rendered available by manipulating the two handwheels at the front of the controller case. Dials graduated for the various speeds are provided for the handwheels. The shaft runs through the bed with levers on either side for hand control of the table. These levers are the same as those used on a belt-driven machine, so that the operator has no new movements or operations to learn.

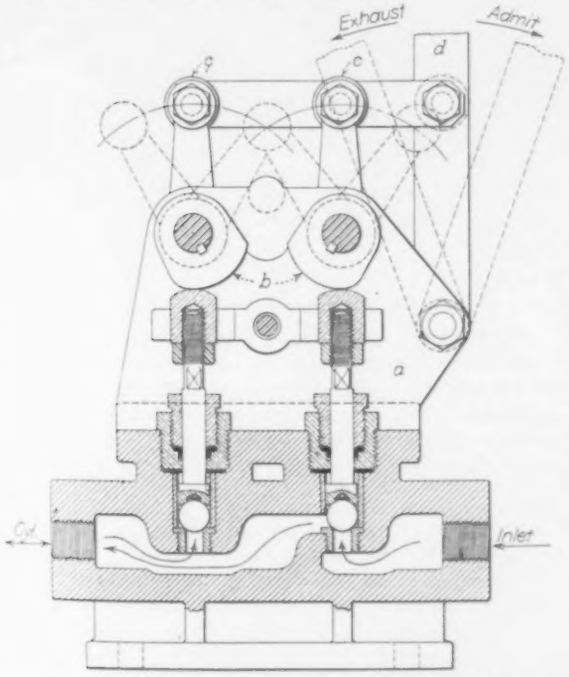
The driving motor is controlled by a patented pendant switch, carried by a swiveling bracket mounted on the arch. This can be moved to any convenient position, and it is possible for the operator to start, stop or reverse the table from any position, without having to leave it and manipulate the levers on the front and rear of the bed. When the table is reversed the motor is disconnected from the line through connections in the controller and becomes a dynamic brake, which stops the table instantly without drawing any current from the line. To prevent the table from running off the bed and also breaking the tools or damaging portions of the machine, a circuit breaker is provided that will stop the motor at once by dynamic braking.

The management of the plant of the Republic Iron & Steel Company at Muncie, Ind., recently received orders to place it in operation July 13. It had been idle since June 1.

Operating Valve for Hydraulic Machinery

The Schutte & Koerting Company, Twelfth and Thompson streets, Philadelphia, Pa., has placed a valve on the market for operating hydraulic machinery in steel mills and other manufacturing plants. This valve, which is known as the Schnicke, does not have any leather cups in the internal working parts, and provision is made for adjusting the valve from the outside from time to time.

The valve consists of a horizontal chamber, having pressure and waste ports and machine finished to receive stuffing boxes, bushings and seat rings. The yokes *a* are bolted to the top of the valve chamber and form bearings for the end of the cam shafts. The cams *b* and the rocker arms *c* are securely keyed to shafts which are rotated by connecting the upper ends of the rocker arms to the hand lever *d*. Seat rings are screwed into the pressure and waste ports of the valve chamber, and between the seat and the stem a hard bronze ball is employed, which changes its position at each operation of the cam. The upper end of the stem is threaded into a bearing nut and also has a jamb nut and square. These bearing nuts travel through a web in the yoke castings and the lower portion of the stems are held in position by the stuffing box gland and bushing. The cams are oppositely mounted on the shafts and are so arranged that when the hand lever is moved in one direction the pressure port is closed before the waste port opens, and vice versa. The wearing parts of the valve are, of necessity, small, which reduces the power required and the cost of repair to a low figure. The outside adjustment enables the operator to take up the wear on the seat, thus preventing leakage and maintaining pressure in the line. They are made in air furnace iron bodies for pressures up to 1000 lb. and of open-hearth steel or hydraulic bronze bodies for pressures above that point. Six diameters of valves ranging from ¾ to 2½ in. are provided for pressures of from 750 to 2000 lb.

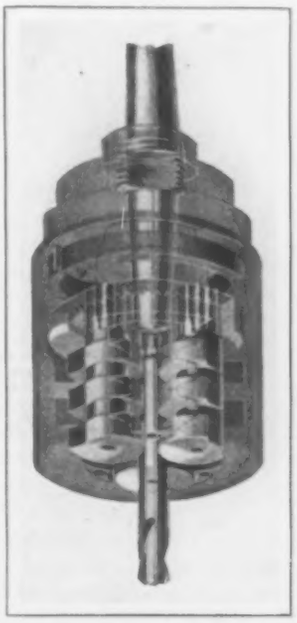


Sectional View of a Three-Way Schnicke Hydraulic Operating Valve

By applying power to the end of the hand lever the upper ends of the rocker arms are forced in one direction or the other, thus rotating the shafts on which the cams are mounted. When the lever is thrown to the right, which is the position to allow the pressure valve to open, the fluid pressure raises the ball from its seat and passes to the machine. While the pressure port is open the waste port remains closed until the pressure on the machine is to be released. By moving the lever in the opposite direction the pressure port is closed and the waste port is allowed to open, thus releasing the pressure. As the stems are provided with a square and a threaded end, it is possible for the operator to adjust either valve from the outside without cutting off the line pressure or the connecting valve in any way.

A New Type of Automatic Drill Chuck

The Automatic Drill Chuck Corporation, Majestic Building, Detroit, Mich., has placed on the market an improved type of chuck, which is known as the Quictite. The special features of this chuck are the use of rotary cams for gripping the drill and a special locking arrangement for holding the upper cap in place.



View of a Recently Developed Chuck in Which Three Sets of Cam Jaws Are Employed to Grip the Shank of the Drill

In operation it is simply necessary to grasp the knurled collar and hold it back against the rotation of the drilling machine spindle. As is customary in this type of chuck, the jaws are opened in this way and the drill is pushed up until it comes in contact with a hardened thrust plug. The knurled collar is then released and the jaws are brought forward and grip the shank of the drill firmly. The rotary cam type of jaws, it is emphasized, give a powerful gripping action and a smooth contact surface. Provision has been made for variable angular relations of the cams, so that the drill is always automatically centered, although the line of contact between the shank and the cams is not always the same. The resistance offered by the cut increases the driving power provided by the chuck jaws in direct proportion. Three jaws, each of which has a triple set of grips, thus providing a total of nine contact points for the shank of the drill, are employed.

The method of locking the upper cap in place is an interesting feature of the design, as instead of attaching it by screws, an extra heavy cap is threaded solidly to the tumbler head and locked in place by flats on the shank registering with a slot in the cap. A lift nut is provided for removing the shank, so that it is not necessary to resort to the battering and hammering that is frequently employed to dislodge shanks.

Three different sizes of chuck are made. The No. 5 size has a capacity for drills from ½ to 1 in. in diameter, a No. 8 size will handle drills from ½ in. in diameter down to 3/16 in., while small drills from the No. 40 size up to ⅜ in. in diameter are accommodated by the No. 6 chuck, which can be opened by hand when the spindle of the drilling machine is running at speeds not greater than 4000 r.p.m.

WELDING MALLEABLE CASTINGS

A Process of Accomplishing This with the Oxy-Acetylene Torch

While the process of autogeneous welding is being used so successfully in all the metal trades, many unsuccessful attempts have been made to weld malleable cast iron, and to those who have experienced disappointment, an explanation of why their efforts failed, with an outline of a method by which these castings can be mended, should be of benefit.

Malleable castings are first made in the condition of hard, brittle, white cast iron and subsequently made malleable by heat treatment. The heating process which converts white cast iron to malleable iron is called annealing, and effects a chemical change in the structure by decarbonization. This decarbonization is nearly complete at the surface and penetrated in a lessening degree toward the center, giving the outside portion the texture of mild steel while the inner portion may retain, in a more or less degree, the qualities of cast iron. When this metal is remelted the carbon is dispersed, and the entire mass reverts to cast iron.

The operator who is used to welding mild steel and cast iron will recall that they are handled differently. That the method used in welding steel to steel would be useless in welding cast iron, or the methods employed with cast iron would be equally unsuccessful with steel. That is practically what he is trying to do when he undertakes to weld a malleable casting. The material is not homogeneous. The bottom portion of the welding being in cast iron, and the top portion in steel, with no definite dividing line between, it is useless to follow the method prescribed for either, and to his trouble is added the difficulty occasioned by the diffusion of the elements in the material melted from the sides of the fracture.

It follows that to successfully mend a malleable casting the process employed must not necessitate the sides of the fracture, that the welding material should fuse at a lower temperature than the casting, and that its adherence, bonding qualities, physical strength and ductility should closely resemble the original casting. After much study and experiment the Vulcan Process Company and their allied interests in Minneapolis are having considerable success in mending broken malleable castings, and a description of their methods will undoubtedly be useful to others who are employed in the metal trades.

In preparing the work for mending, the fracture is chipped away in the form of a V groove with the pointed bottom just coming to the surface on the opposite side, or, if the casting is thick and the opposite side accessible, two grooves are cut with their pointed bottoms meeting in the center. The part surrounding the fracture is then heated with an oxy-acetylene torch to a bright red, and sprinkled with Vulcan bronze flux followed by a few drops of Tobin bronze melted from the welding rod. If the bronze remains in a little globule the work is not hot enough, but if it spreads and adheres to the surface, the temperature is right, and the groove should be quickly filled. It is not advisable to keep the work hot any longer than is necessary, but to make the mend as quickly and at as low a temperature as possible. The behavior of the bronze affords a guide in regulating the temperature. This process cannot be called autogeneous welding, but a malleable casting mended in this way is practically as good as one piece. It has about the same tensile strength and ductility as the original and the process has the advantage of being very quickly performed.

A Universal Tool for Ratchet Drilling

A tool for taking the place of the "old man" or drill post and capable of far wider application than that commonplace device, is being manufactured by the Lutz-Webster Engineering Company, Inc., Philadelphia, Pa., maker of compression tools. The new tool can be used advantageously with the ordinary ratchet, with the Lutz compression ratchet or with a straight shank drill. As shown in the accompanying illustration, it is universal in its application, the supporting column being fitted with solid and swivel arms, the latter permitting adjustment in any angle and the drilling of holes in places difficult of access. Self-feed is provided by an individual feed screw which can be fastened at any point in the tee slot of the arm by a clamp nut. Reversing the feed screw in the nut which slides in the slot provides either a recess or point as needed. The Lutz compression wrench, which is used in conjunction with a straight shank drill in the improved "old man," was described in *The Iron Age* of April 16, 1914. The halftone shows the adjustment of a Lutz ratchet where a hole is being drilled at an angle, a straight shank drill in position for drilling and a Lutz compression wrench.

Improved Drill Post with Solid and Swivel Arms—Puts Compression Ratchet and Straight Shank Drill in Position for Use

Welding High Speed to Ordinary Steel

The following information has been obtained from a company which has had considerable experience in welding high-speed steel to ordinary steel. It is emphasized that it is very necessary to prevent the weld from cooling between the time it is made and the annealing. In order to obtain the best results the temperature should not drop below 1200 deg. F. This is only possible where a furnace is close to the welder and the parts welded are placed in the furnace immediately after the welding operation.

Probably the more satisfactory arrangement, it is suggested, would be to have two furnaces, one on each side of the welder. Then he could throw the welds into one of these furnaces until it is filled, allowing it to cool while the other furnace is being filled and then repeating the cycle of operations. The point is that if the weld is allowed to cool before annealing it is very brittle and easily broken.

The Majestic Furnace & Foundry Company, Huntington, Ind., has changed its name to the Majestic Company.

Modern American Blast Furnace Practice*

Further Details of Operation—Output and Utilization of the Gas—The Economical Phase and the Human Factor

BY HERMANN H. BRASSERT†

Blast furnace operations are comparatively simple where the same grade of iron is made continuously. The practice becomes more intricate when frequent changes from one grade to another are required. Without good furnace lines it is impossible to vary the grades without loss of quality and economy.

In merchant furnaces generally much smaller hearth dimensions are found than those which have been developed on modern furnaces connected with steel works, and higher or flatter boshes are frequently chosen, the former to accommodate the higher melting zone on foundry grades, and the latter to facilitate the production of basic iron, recognizing the value of low boshes but perhaps not the advantage of larger hearths. Such designs are poorly suited for successful operation on varying grades, particularly those which require basic slags. Merchant practice, above all others, demands lines which keep the furnace walls clean. The low, steep bosh accomplishes this, while the larger hearth favors uniformity of product and fuel economy. Foundry grades, spiegel, ferrosilicon, and ferromanganese are being made in the large hearths of modern furnaces with excellent results, surpassing those obtained on smaller furnaces especially designed for such practice.

In producing these grades, the first step is to so modify the physical and chemical quality of the slag as to make it most favorable to the transfer of the desired elements into the iron, and to the elimination from the iron of those ingredients which are not wanted. For instance, in high silicon Bessemer or foundry practice, a much lower fuel consumption can be obtained if, by a decreased proportion of bases in the slag its ability to retain silica has been lessened, thereby favoring the reduction of silicon into the iron. Lower fuel consumption and higher blast heats will then assist in concentrating the melting zone and maintaining a high hearth temperature, which will increase the ability of the leaner slag to dissolve and retain the sulphur, resulting in a uniform grade of low sulphur iron. The production of high grades of ferrosilicon is made possible only by a large preponderance of silica in the burden and slag. Even then, the highest blast temperatures are required to reduce economically large quantities of silicon.

SPIEGEL AND FERROMANGANESE

In spiegel and ferromanganese practice, where it is desired to reduce the maximum amount of manganese into the product, with the least loss of manganese in the slag, a very basic slag must be carried. By the utmost concentration of heat in the hearth through the use of the highest blast temperatures, the slag can be kept sufficiently fluid, in spite of being very "limey," and the manganese in the slag can be held uniformly below 6 per cent. The loss of manganese in the gases, which occurs more or less in proportion to the top temperatures, is reduced to a minimum by concentrating the zone of fusion and thereby lowering the top temperature. By charging suitable percentages of raw coal, the distillation of which consumes heat, the top heats can be still further reduced. The temperature of the escaping gases can in this manner be kept below 600 deg. F., even when producing 80 per cent ferromanganese; and the gases, which are generally dark yellow or brown, can be observed issuing from stove and boiler stacks with but the faintest tint of yellow.

Below are some results recently obtained on No. 1 furnace at the South Works, which illustrate the practice just described:

	Total tons	Daily average	Coke per ton	Coal per ton	Temperature, degrees Fahrenheit: Blast	Temperature, degrees Fahrenheit: Top	Average grade	Per cent. Mn. in slag
Ferromanganese, December, 1913.....	3870	125	3896	288	1470	550	80 per cent. Mn.	5.81
Spiegel, February-March, 1914.....	6528	272	2858	...	1167	607	19 per cent. Mn.	2.18
Ferrosilicon, March-April, 1914.....	7396	161	3867	...	1214	676	11 per cent. Sil.	....

On the same lining this furnace had previously produced 644,815 tons of Bessemer, basic, spiegel, ferrosilicon and ferromanganese, which illustrates the possibility of making use of old linings for the manufacture of special grades.

BLOWING OUT

In blowing out, the temperature of the escaping gases should be kept so low as not to cause any damage to the furnace top. This is accomplished by spraying water on the bell and the descending stock, and gradually decreasing the wind volume. Accumulations on the walls of stack and bosh should be cleaned off in the process of blowing out by using an acid slag and short tuyeres. A suitable quantity of fine materials, such as boiler ashes or granulated cinder, charged on top of the final rounds of burden, will keep the blast pressure sufficiently high, even when the stock line approaches the tuyere level, to allow most of the iron and slag to be lifted out of the hearth during the last cast. This applies only to American practice where the tapping hole slants downward. In this manner a large amount of the labor for cleaning out the bottom can be saved. The danger of gas explosions is avoided by filling the gas flues with steam before any air is allowed to enter.

The unwarranted prolongation of furnace campaigns on worn-out lines is often a source of enormous losses on the manufacture of iron, and one which seems to be frequently overlooked in the effort to achieve a large production on a lining. It is poor policy to set a standard tonnage for a cam-

*Fourth and last portion of a paper presented at the New York meeting of the American Iron and Steel Institute, May 22. The other three installments appeared in *The Iron Age*, June 25, July 2 and July 9.

†Superintendent of blast furnaces, Illinois Steel Company, South Chicago, Ill.

paign, since one of 300,000 tons may be more destructive to the furnace walls than another of twice that tonnage. The economy of practice alone should determine the end of the furnace campaign. The vainglory of accumulating a large tonnage on a lining is a poor compensation for losing money, as well as the furnace organization's pride in a low fuel consumption.

The possibility to maintain low fuel consumptions on furnace campaigns, and still reach high tonnages, is demonstrated by the following records as at May 1 of present campaigns of blast furnaces at the South Works of the Illinois Steel Company:

	Total production, tons	Aver. coke consumption, lb.
No. 1 Furnace—Operating on special grades.		
No. 2 Furnace	475,442	2,044
No. 3 Furnace	788,512	2,056
No. 4 Furnace	36,414	1,806
"E" Furnace	417,117	1,939
No. 5 Furnace	41,252	1,944
No. 6 Furnace	247,572	2,116
No. 7 Furnace	279,639	1,975
No. 8 Furnace	223,175	1,923
No. 9 Furnace	593,007	2,028
No. 10 Furnace	205,698	2,005

Furnaces Nos. 2, 6, 9 and 10 were blown out last winter on account of business conditions and not on account of worn-out linings. The others are still operating.

FURNACE GAS, ITS OUTPUT AND UTILIZATION.

By modern utilization of the by-products, their disposal, formerly a source of expense in the operation of a blast furnace plant, has been converted into a handsome profit. The furnace gas is the most conspicuous in this respect. It has become a potent, economical factor as the source of power for steel works and other industries or public utilities located in the district.

The rate of gas production and its total B.t.u. value is a function of the coke consumption, as well as of the pig-iron output. Extensive tests were conducted at the South Works to establish the relation of these items and to determine the amount of surplus gas for the production of power which would be available from our furnaces under various conditions of practice. For two full years, 1911

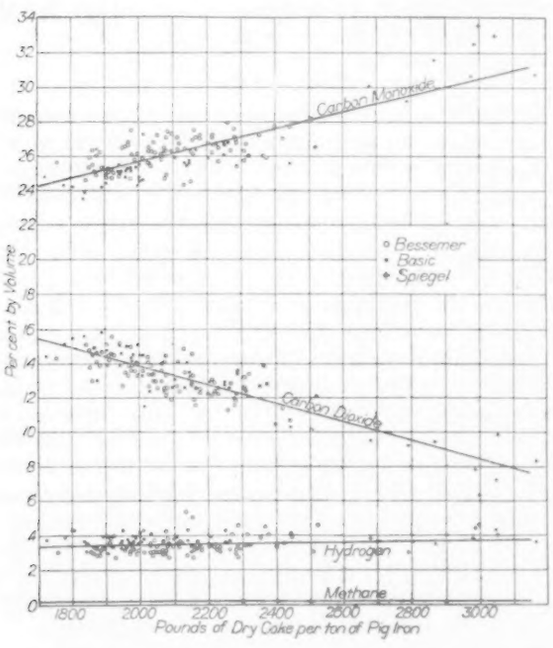


Fig. 1—Effect of Coke Rate on Analysis of Blast Furnace Gas

and 1912, on all blast furnaces of the plant making basic, Bessemer and spiegel, continuous gas samples were taken and analyzed every 24 hr., and the results were averaged for each month. The averages are plotted on Fig. 1, each point representing a full month's operation of a furnace. On these averages and the monthly performance of the furnaces, the diagrams of Figs. 2 to 5 are based. These show successively the relation of gas volume and heat value to coke consumption and that of pig-

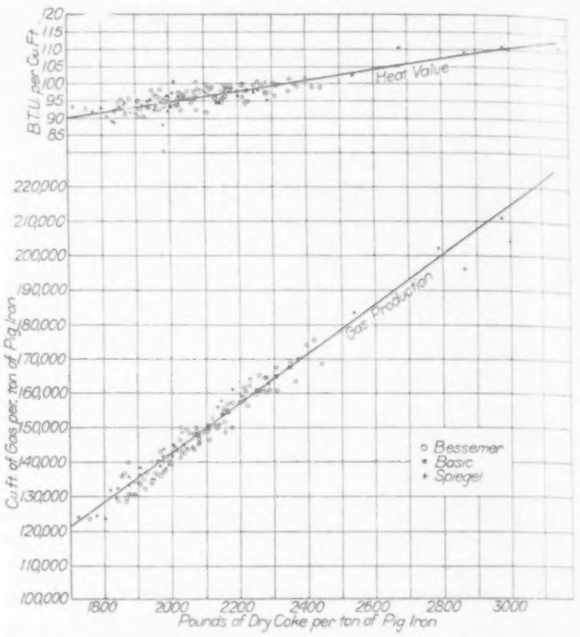


Fig. 2—Effect of Coke Rate on Production of Blast Furnace Gas

iron output to coke consumption volume and total calorific value of the top gases.

These diagrams show that the gas volume per ton of iron and the calorific value per cu. ft. of gas increase with higher coke rates, but that the fuel consumption, in our practice, decreases with an increase in output. It is this latter relation which turns downward the curves on Fig. 4, representing the amount and calorific value of the top gas per unit of time. These and the lines of Fig. 5, which show the same items per unit of product, distinctly prove that with larger output, the amount of heat per ton of iron carried off with the top gases, decreases, and clearly demonstrates the economy of fast driving with Mesaba ores.

The heats of combustion of the constituent gases were taken as follows, sensible heat due to top temperatures not being considered:

CO	324 B.t.u. per cu. ft.
H_2	275 B.t.u. per cu. ft.
CH_4	915 B.t.u. per cu. ft.

The computations of gas production, Fig. 2, are made on the basis that the carbon charged as coke reappears in the gas, assuming that the weight of carbon in the limestone is equal to the carbon in the pig iron and flue dust produced. The error of this assumption is less than 1 per cent.

The method of calculating the volume of gas is as follows:

Tons Bessemer iron produced per day	552.5
Coke rate, pounds per gross ton	1988
Carbon in coke, per cent	88.72
Analysis of gas:	
CO, per cent	25.8
CO_2, per cent	13.6
H_2, per cent	3.0
CH_4, per cent	.2
N, per cent	57.4
B.t.u. per cu. ft.	93.3

$$\text{Cu. ft. gas per ton of iron} = \frac{\text{1988 lb. coke} \times 88.72\%\ \text{C}}{(25.8\%\ \text{CO} + 13.6\%\ \text{CO}_2 + .2\%\ \text{CH}_4) \times .0315} = 141{,}400$$

The constant 0.0315 is the weight of carbon in a cubic foot (at 29.92 in. and 62 deg. F.) of any gas in which there is one atom of carbon per mole-

cule. All volumes are referred to 62 deg. F. and 29.92 in. barometer.

The following formulæ are based on these investigations, R being pounds of dry coke per ton of pig iron and T being tons of iron per 24 hr.

(1) B.t.u. per cu. ft. = 0.016 R + 62.5.
(2) Cu. ft. gas per ton iron = 71.4 R.
(3) B.t.u. in gas per ton iron = 1.143 R^2 + 4462.5 R.
(4) Cu. ft. air at tuyeres per ton iron = 51.4 R.
(5) Cu. ft. air per minute = .0357 R T.

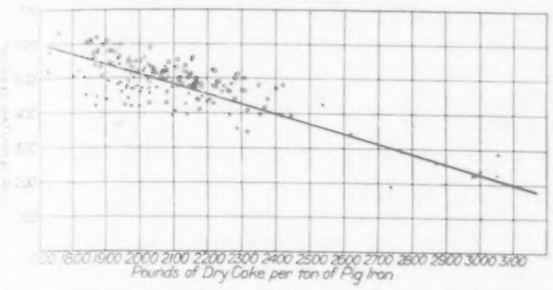


Fig. 3—Relation of Tons of Iron per Day to Coke Rate

Fig. 3 shows the relation of coke rate and tons iron per day during the performance of the same furnaces for the same period as shown on Figs. 1 and 2. The mean line drawn through these points has the formula:

$$(6)\quad T = 1090 - .2875\ R$$

or,

$$(7)\quad R = \frac{1090 - T}{.2875}$$

Combining (7) with (2) and dividing by 1440 min. gives

$$(8)\quad \text{Cu. ft. gas per min.} = 188.1\ T - .1726\ T^2$$

which is plotted on Fig. 4. Further, by combining (8) with (1) and (7) gives

$$(9)\quad \text{B.t.u. per min.} = 23{,}155\ T - 31.705\ T^2 + .00960\ T^3.$$

From (2) and (7)

$$\text{Cu. ft. gas per ton iron} = 270{,}710 - 248.35\ T.$$

While from (3) and (7)

$$\text{B.t.u. per ton iron} = 33{,}350{,}000 - 45{,}670\ T + 13.83\ T_2.$$

The curves on Fig. 4 show that the amount of gas, and, still more, its calorific value is practically constant within the range of our usual daily variations of pig iron production. This feature is of special interest where other industries rely upon the blast furnace for a constant supply of power.

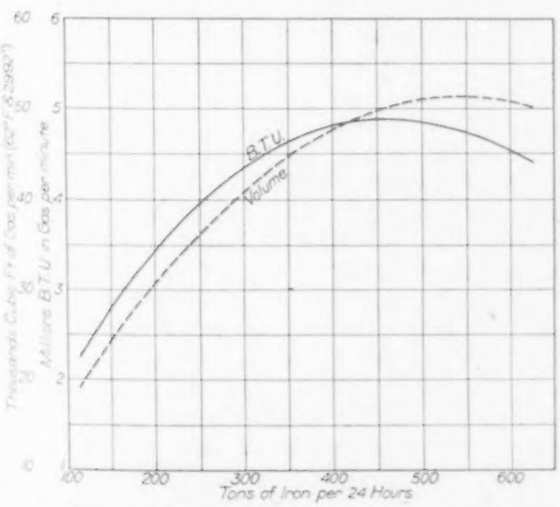


Fig. 4—Effect of Tons of Iron per Day on Amount of Gas Produced per Minute

The nitrogen content of the gas, determined by difference, if plotted in conjunction with the CO_2 to CO lines on Fig. 1, forms an almost horizontal line. This indicates that the air requirement per unit of carbon, in the practice represented by the test period, was almost constant. Even when the proportion of "direct" reduction was increased through fast driving, this evidently did not decrease the amount of carbon which reached the tuyeres appreciably more than the dissolution of carbon by CO_2 in the practice with higher fuel consumption, due to poorer coke or wornout lines. In the former case the carbon, as well as the heat consumed by "direct" reduction, was replaced by an increase in blast temperature, smaller radiation losses, and other advantages derived from fast driving. In the latter the loss of carbon was replaced by an increase in coke consumption.

THE FURNACE AS A GAS PRODUCER

Recent experiments at South Works and Gary have proved that in times when there is no demand for the pig iron, the production of power can be maintained by converting a furnace stack into a gas producer, charging a mixture of coke, coke breeze and coal with open-hearth and other waste slags as flux.

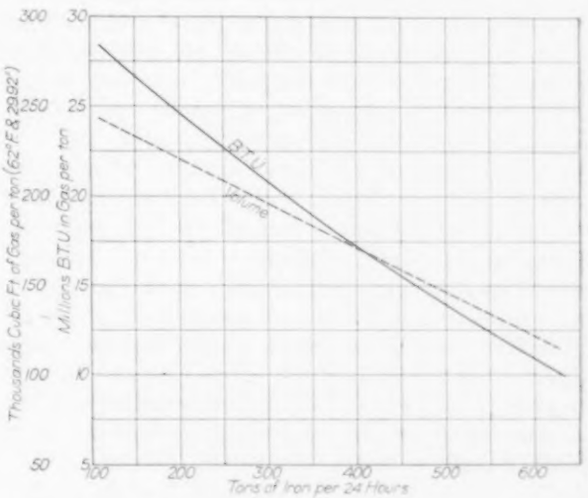


Fig. 5—Effect of Tons of Iron per Day on Amount of Gas Produced per Ton

The latest development in Germany is the mixing of blast-furnace and coke-oven gas. By automatic regulation the most desirable heat value can be uniformly maintained. The use of furnace gas or mixed gas for the heating of coke ovens makes a larger amount of the richer coke oven gas available for outside use, as, for instance, municipal heating and lighting. The higher and more constant heat value of the mixed gas also solves the problem of efficient gas engine operation in large electric power plants, where uniformity of speed is the first requirement.

Many blast-furnace slags can be used for the production of cement, an industry which has been developed to large proportions in this country and abroad. Another profitable outlet for the slag, frequently found in Germany and undoubtedly applicable to many plants in this country, is the manufacture of high-grade building brick.

OPERATING ECONOMICS

The increased output of modern furnaces, coupled with the many labor saving improvements, has lowered to a remarkable extent the cost of operation per ton of iron. The vast array of common labor which formerly performed the hardest, roughest and most dangerous duties around a blast furnace, has been eliminated, and their places have been

(Continued on page 178)

ESTABLISHED 1855

THE IRON AGE

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Fogging a Clayton Bill Issue

No one need be misled—certainly manufacturers are not—by any plea that the Clayton bill exemptions for labor unions are needed to establish beyond question the legal status of such organizations. Times without number court decisions in cases involving lawlessness by trade unions have contained clear-cut declarations of the right of men to combine in such organizations for the purpose of raising wages and otherwise advancing their interests. Strikes without number have been carried on by unions and won, where no question was raised or could be raised as to the legality of such combined effort to secure better conditions. In affirming the judgment of the United States Court, Connecticut district, in the Danbury hatters' case, Judge Coxe of the United States Circuit Court of Appeals made this statement which is typical of court deliverances on this subject:

> No one disputes the proposition that labor unions are lawful. All must admit that they are not only lawful, but highly beneficial when legally and fairly conducted; but like all other combinations, irrespective of their objects and purposes, they must obey the law.

It is only dust-throwing to make the claim that the legality of trade unions needs clearing up, and yet a labor union journal, in telling how innocuous and yet necessary the Clayton bill exemptions are, undertakes to say that "for years many of our courts, while not directly asserting the principle, have handed down decisions which conveyed the inference that trade unions were in purpose illegal organizations."

Little exception could be taken to this statement if it were amended to say that many court decisions have not only conveyed the inference but have said in no unmistakable terms that certain trade unions whose members were put on trial had carried on illegal operations. But the unions and their subservient members of the House would dispense with all this court interference. By one stroke to put on the statute books an act guaranteeing the success of strikes, union treasuries are protected and union members are released from the menace of fines and imprisonment. For all the specious Congressional oratory on putting the man above the machine or the ore in the ground cannot conceal the naked purpose of the labor union sections of the Clayton bill. It is that when once the machinery of a strike is set in motion the militant unions shall be free to work their utmost upon any employer who refuses their demands, or upon any workman who tries to work when they have decreed idleness.

Business organizations have moved none too soon in exposing the vicious intent of the labor sections of the bill and the action of the Senate committee in the past week indicates that these protests have had their effect.

The Golden Rule in Purchasing

Purchasing departments too seldom consider the selling problems of their manufacturing organization. And the larger the establishment, the truer does this seem to be. The buyer quite commonly thinks only of his side of a contract. He construes it literally and shows little leniency or flexibility. He occasions no end of trouble to the seller, by filing complaints over minor items, many times requiring railroad journeys and expensive outlays to settle a point which a spirit of co-operation would have cleared. In short, the members of the purchasing staff, in their zeal for pursuing what they believe is unequivocally right, forget to practice the golden rule. While they are harassing the business house from which they are buying, their own sales department is striving to meet the demands of the purchasing department of a third company.

With the development of works' laboratories for inspection and study of materials for manufacture, an army of experts is rising, composed of those whose early training tends to make them interpret specifications microscopically. It goes without saying that compliance with purchasers' ideas is, of course, expected. Life, limb and property may be dependent on quality. But the buyer does not always make himself clear. He is indeed sometimes not sure what he wants. He will hide behind technicalities and put the seller in the position of an educator without pay. Plants have been installed, for example, on the basis of plans which the purchaser delays indefinitely to approve, making the installer take a risk which he should not be called on to carry.

If the seller is supplying machinery or equipment and is made responsible for the engineering involved, then it is only natural that he should be likewise responsible for his guarantees. It is, however, unreasonable to have the buyer, or a third party engaged as a consulting advisor, take upon himself to direct the engineering and then expect

absolute and rigid guaranteed performance. The stress of competition usually brings about conditions such that the seller takes the chance that the engineering advice or stipulations on the buyer's part are more a matter of form. When close adherence is demanded to unwise stipulations, which may represent half-digested or second-hand information obtained, perchance, from the seller himself, the seller has his troubles. These are commonly noted when the engineers engaged to safeguard the interests of the buyer may be heavily indebted to the seller for the information he must necessarily pick up from time to time. Then he will be a stickler for points of no importance whatever.

Many annoying incidents would be eliminated if those in charge of buying allowed themselves to think of the other side of the bargain, or would take the broader attitude which their own selling departments praise when it is noted among their own customers. Business is so largely dependent on honor among men that it is discouraging to note the smallness and indifference which make unnecessary demands on the seller, mainly because some stipulation of the contract gives some license so to do.

Destination of Iron and Steel Exports

Members of the iron trade are well informed as to the volume of our iron and steel exports, a monthly statement of exports by products being published, but this statement gives only the total exports in each line, and information as to the destination of exports is not at all widespread. The Bureau of Foreign and Domestic Commerce has just published its tables of exports by countries of destination, extending the figures through the fiscal year ended June 30, 1913, and from this presentation much that is interesting can be obtained. Our exports are far from uniformly distributed, as to the various products, in the different countries to which we export. Certain countries take very large quantities of one description of material and nothing at all of other descriptions, partly in accordance with competitive conditions, but more largely in accordance with the particular kind of development the country is undergoing. Cost of transportation, too, exercises an important influence, the heavier or less valuable materials as a rule going the shortest distance afield.

The total exports of iron and steel, including scrap, pig iron, rolled iron and steel, pipe, wire products, etc., amounted in the fiscal year 1912 to 2,509,797 gross tons, and in the fiscal year 1913 to 3,019,142 tons. Recently the exports have been less, but the presentation by countries of destination, just published, extends only through the fiscal year 1913.

About three-fourths of our exports of 102,201 tons of iron and steel scrap in the fiscal year 1913 went to Canada, while about one-fourth went to Italy, exports to other countries being negligible. Mexico took one ton. The exports to Italy are of recent origin, being five times as great in 1912 and 1913 as in 1910. Italy has been developing a steel industry of late, largely on the basis of working up scrap. In each of the past two years our scrap exports to Italy exceeded 25,000 tons, whereas our pig-iron exports to that country were only 5000 tons in 1912 and 20,000 tons in 1913. Our pig-iron exports have been chiefly to Canada, which in 1913 took 222,184 tons out of the total 287,022 tons exported, and England, the second country, took less than one-tenth as much as Canada. Italy came third and Austria-Hungary fourth, with 8101 tons.

In ingots, blooms, billets, sheet bars, etc.—all "unfinished steel" except rods—our exports are largest to England, with 150,000 to 175,000 tons out of the total 235,000 tons exported, Canada taking half as much in 1913, but less in 1912. There was practically no demand from other countries. In wire rods, on the other hand, our exports have been almost exclusively to Canada, from 98 to 99 per cent. of the total in each of the past four years, the totals ranging from less than 20,000 tons in 1910 to 48,000 tons in 1913.

The destination of our rail exports is of particular interest. The total rail exports have been as follows, in fiscal years:

Years.	Tons.	Years.	Tons.
1909.....	234,128	1912.....	417,547
1910.....	369,578	1913.....	452,545
1911.....	391,428		

While the above annual totals show considerable variation, the demands of individual countries have varied much more widely. The American rail mills, in other words, have sold in one country or in another according as opportunity afforded. With rails, of course, there is no such thing as building up a trade such as can be developed in nails or fencing. The rail exports to South America ranged from 50,000 tons in 1909 to 130,000 tons in 1910, 96,000 tons in 1911, 131,000 tons in 1912 and 94,000 tons in 1913. Even as to South America, however, there were wide variations in the distribution. In the first three years named Argentina easily led, taking more than one-half the total, while Brazil was a moderately close second. In 1912 the Argentine tonnage decreased, while Chile suddenly jumped past both Brazil and Argentina, dropping to third place again in 1913. The distribution in 1913 was: Brazil, 32,000 tons; Argentina, 25,000 tons; Chile, 14,000 tons; other South America, 23,000 tons.

Mexico has taken a steadily decreasing tonnage of rails—80,000 tons in 1909 and a smaller quantity each succeeding year until 20,000 tons was reached in 1913—and the Cuban tonnage has decreased slightly from the 40,000 tons taken in 1910.

With the large decreases in rail exports to South America, Cuba and Mexico, it will naturally be wondered how our total rail exports increased as they did, making 1913 a record year. All the losses elsewhere on the American continent, and a part of the net increase, were made up by increased exports to Canada, these exports running from 25,000 to 40,000 tons in 1909-10-11, but jumping to 118,726 tons in 1912 and then to 138,439 tons in 1913. Present developments in Canada promise a short life to this newly acquired trade. Rail markets outside the American continent have been relatively small for us; in 1913, 15 per cent. of the total went to Oceania, 13 per cent. to Asia (nearly three-fourths of this quota being for Japan and nearly one-fourth for China), and only 1 per

cent. of the total went to Africa. Europe took 3045 tons.

Our exports of plates and black sheets are largely to Canada. In 1913 there were 263,000 tons of steel plates exported and 133,000 tons of black sheets, 75 per cent. of the total plates exported and 81 per cent. of the sheets going to Canada. In plates Japan and Australia came next, with 6 per cent. each. In sheets the distribution, after Canada, was altogether different, as Chile was second, though a distant second, with 8 per cent., and the third country, which curiously enough was none other than Scotland, took somewhat less than 4 per cent.

Galvanized sheets, being much better able to stand exposure, naturally traveled farther afield than black sheets. Of the total 115,000 gross tons of galvanized sheets exported in 1913, only 32 per cent. went to Canada, against 81 per cent. of the black product, while 7 per cent. went respectively to Mexico, Argentina and Australia, the Philippine Islands following with 6 per cent. and Japan coming next with 5 per cent. Galvanized sheets were exported in 1913 to no less than 58 countries, even Europe taking in the aggregate 5 per cent. of the total. By some chance England took 34,593 pounds, or nearly a carload.

Nails, however, are the really ubiquitous commodity. Of 1,220,000 kegs of wire nails exported in 1913, no single country received as much as 16 per cent. Japan and China each took between 15 and 16 per cent., and third place was actually taken by England, with 12 per cent., and England, Scotland and Ireland together rolled up a total of nearly 16 per cent. Next came, in order, the Dutch East Indies, Hongkong, New Zealand, Cuba, the Philippine Islands and Canada, the proportions ranging from 6 per cent. for the Dutch East Indies down to 4 per cent. for the Philippines and Canada.

Cut nails, though the total exports were only 107,000 kegs, were distributed to no less than 37 different countries, Chile leading with 50,000 kegs and Cuba and Mexico following with much smaller proportions.

Exports of plain wire, amounting to 138,000 gross tons in 1913, were almost equally well distributed. Canada took 32 per cent., Argentina following with half as much. Of the total 88,000 tons of barb wire Canada and Brazil each took 16 per cent., British South Africa following with 15 per cent., while Mexico and Argentina took between 7 and 8 per cent. each. Barb wire was naturally much more widely distributed than plain wire. It might be supposed that by this time we should have acquired a considerable trade in woven wire fencing, but such is not the case, the value of such fencing being only 8 per cent. of the value of barb wire exported.

This brief resume is sufficient to show that the building up of an export trade is a tremendous undertaking, both as to the work which must be done in finding the markets and familiarizing buyers with the goods, and in the risks which must be assumed when the requirements of a country, as in rails, are relatively temporary. One country requires plates, another pipe and another barb wire. Italy will take scrap while England will take unfinished steel but not finished products.

A Use for Management Literature

In view of the revival in Congress of bills hostile to scientific management, and particularly to time studies, it is quite in order to make use of published information on the positive good of such management by sending carefully marked copies to members of Congress. An opportunity of this description, for example, lies in the concluding portion elsewhere in this issue of the paper by George DeA. Babcock, which has been running in these columns for some weeks. This part tells something of the esprit de corps of a manufacturing organization of national prominence. If success has come to the employees of such a company as a result of bettered manufacturing conditions, the fact ought to have some weight with legislators in Washington. It is hardly to be supposed, of course, with the present temper of Congress toward union labor influence that such concrete evidence will have a marked effect on the legislative programme; but every good planting ought sooner or later to bring its good fruit.

It will naturally take a long time to overcome the popular prejudice against what is regarded as merely a scheme for keying up manual and mental operations to a high pitch. But it would be like going back to the days of mob bonfires for mowers and reapers to pass laws dictated by ignorance of the real workings of scientific shop management. As a direct educational campaign, there could be nothing better than to get before Congressmen short, striking passages from a paper like Mr. Babcock's.

From Washington the call has gone out to American manufacturers to bring their shops to higher efficiency and so be able to meet low-tariff competition. Yet these political task masters of our manufacturers need to find out that the barring of advanced methods is simply the old story of bricks without straw.

CORRESPONDENCE

Drinking Not Necessary to Secure Business

To the Editor:—I quite agree wtih the sentiments expressed in the communication from G. D. Crain, Jr., published in *The Iron Age* of July 2, with regard to the "good fellow" salesman. I have had considerable selling experience, and although I am not a teetotaler, I have never found it necessary to drink in order to obtain business. We have in our sales organization a salesman who is a wonder along his line. He is far and away the best salesman I have ever known. He was formerly independently wealthy, and at that time was a hard drinker and a great entertainer of his customers. He wasted all of his substance in dissipation, and got himself deeply in debt. After a heart-to-heart talk with the officials of the company, the company assumed his debts and he promised faithfully to quit drinking. This he has done absolutely—which is another indication of considerable strength of character. Since his reform this man is more efficient as a salesman and vastly more reliable otherwise than ever before. His value to the company has increased a hundred per cent.

SALES MANAGER

The furnace of the Temple Iron Company at Reading, Pa., went out of blast for repairs on July 13. It had been in operation since January 10, 1912.

Stove Founders and Molders Agree on Prices for Molding Machine Work.

An agreement on piece prices for stove plate work made on molding machines has been reached between the Stove Founders' National Defense Association and the International Molders' Union of North America. For seven years the question has been discussed at conferences of the two organizations. The agreement was reached at Atlantic City, June 23, when the full joint conference committee, consisting of six representatives from each side, was present. The International Molders Journal says of the result:

One of the serious difficulties which had been encountered at past conferences was the problem of applying in a practicable manner any principle which might be adopted relative to pricing this work. The agreement which has been reached establishes a simple method of universal application for the pricing of work made on molding machines, and it has apparently removed entirely some of the features connected with molding machines in stove foundries which had caused serious concern and apprehension to the representatives of both associations during past conferences.

Two sheets of base prices were drafted, these containing the name of the piece to be made, number of board, size of flask, and net cash price for squeezer molding machines and Arcade modern molding machines respectively. Among other features of the agreement are provisions that power squeezers shall be considered as equivalent to the hand Arcade modern molding machine; that the placing on or taking off of the vibrator attachments on machines shall not affect the board prices; that in pricing plates no distinction shall be made between cast iron and aluminum plates; that 3 per cent. will be deducted from board prices when roll-up flasks and roll-up match plates are used; that when work is printed black an addition of 5 per cent. shall be made to the board price. Deductions of the following percentages are made for work done by employees other than the machine operators, who are paid by the owner: Carrying iron to molders' floor, 2 per cent.; cutting and trimming up of sand, 3 per cent.; shifting weights and sleeves, 4 per cent.; shaking out, wetting down sand, taking out and trimming castings, 7-2 3 per cent.

It is provided that where work does not come in one of the classes specified in the base sheets, because of large size or great difficulty in molding, a higher price per mold is to be set according to the merit of the job. The preparation of the base sheets was a matter of long consideration and the prices were based on a vast amount of statistical matter accumulated in the operations of many foundries. When work made on molding machines is to be priced for the first time by comparison with the "base sheets," representatives of both associations will take up the work.

Alton Steel Company in Receiver's Hands

The Alton Steel Company, Alton, Ill., was placed in the hands of a receiver July 8, on the petition of the Alton National Bank, Citizens National Bank, First Trust & Savings Bank and Alton Banking & Trust Company, all of Alton, controlling about two-thirds of the $300,000 of bonded indebtedness of the company, which also has a floating debt of about $150,000. James Duncan, president Duncan Foundry & Machine Works, Alton, was named receiver, with authority to operate the plant if in his opinion it will be profitable to do so. A second mortgage on the plant, for $450,000, is held by W. R. Fownes and other Eastern capitalists, who are reported to have invested altogether about $550,000. The company was originally incorporated for $600,000 and to this was later added $350,000. The officers of the company say that they have about $80,000 of collectible accounts outstanding and also many contracts to fill, but specifications have been slow on these, interfering with the successful operation of the plant. The company was organized by T. S. Clark, who is president and in charge of the business, and his associates, all of western Pennsylvania. J. R. Hastings is vice-president, M. L. Mozier secretary, and E. J. Anglin superintendent. The receivership was asked on the formal plea that insurance was not kept up and that an agreement to keep $100,000 in the treasury had been broken. It is believed that the company will be put on its feet again with little difficulty, particularly if business revives as is now predicted.

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Steel Corporation Orders Increase in June

The statement of the unfilled orders on the books of the United States Steel Corporation on June 30 shows them to have been 4,032,857 tons, which is 34,697 tons larger than the amount reported May 31. This increase is the first since the one recorded in February when the books showed 5,026,440 tons on hand, whereas at the close of May there was a decrease of over 275,000 tons from the previous month. Incoming orders for June were at the rate of about 31,000 tons per day as compared with 19,000 tons in May, daily shipments being estimated at about 30,000 tons in June as against about 29,000 tons in May. Below is given a statement of unfilled tonnage for each month beginning with the high point of December 31, 1912:

June 30, 1914	4,032,857	August 31, 1913	5,223,468
May 31, 1914	3,998,160	July 31, 1913	5,399,356
April 30, 1914	4,277,068	June 30, 1913	5,807,317
March 31, 1914	4,653,825	May 31, 1913	6,324,322
February 28, 1914	5,026,440	April 30, 1913	6,978,762
January 31, 1914	4,613,680	March 31, 1913	7,468,956
December 31, 1913	4,282,108	February 28, 1913	7,656,714
November 30, 1913	4,396,347	January 31, 1913	7,827,368
October 31, 1913	4,513,767	December 31, 1912	7,932,164
September 30, 1913	5,003,785		

The Iron and Metal Markets

HOLDING UP PIG IRON

Southern Shipments Affected by Freight Reduction

Some Further Rail Buying—Basic Iron Sold by Chicago Steel Works

The immediate effect of the reduction in freight rates on Southern pig iron to Northern points has been the holding up of shipments of such iron by a good many foundries. In the month that elapses before the new rates are effective users plan to take in no more iron than they will need for bare operation.

In some districts, as in northern Ohio, the price of local iron has long been so much below the level for Southern grades that the 35c. freight reduction on the latter does not restore the equilibrium. But southern Ohio furnaces, already hard hit, will feel Alabama and Tennessee competition more keenly, and Chicago district furnaces will find Southern sellers much more troublesome in their immediate territory.

The decline in merchant pig iron output has not yet been checked. A Cleveland furnace and one at Erie, Pa., are about to go out; and several suspensions in the Hanging Rock district and one in eastern Pennsylvania will follow soon after. The great foundry industry still lags, and the pig iron market moves with it. Concessions are still made when any good sized business appears. Buffalo furnaces, for example, dropped down to $12.50 for No. 2 iron lately, but for the present most of them are back at the $13 level. For Southern foundry iron $10 is common, though a good many $10.25 sales are reported.

Basic iron is more active. Sales include 5000 tons to Harrisburg, 6000 tons at Pittsburgh and 15,000 tons to a St. Louis district steel foundry. This last iron was sold by a Chicago steel company and the price was close to the $13 furnace basis of similar sales three months ago. A Kokomo, Ind., inquiry calls for 15,000 tons.

In finished steel, which it is not unusual to find out of line with the merchant pig iron trade, varying degrees of encouragement are noted. There is no expectation of more than slow progress, nor are there signs of the near resumption of free contract buying. The mills are following the same policy as in January in limiting low priced sales. At the same time buyers will not make contracts at more than today's prices and are not in fear of paying more later.

The Steel Corporation appears to have fared better than some of its competitors in the amount of its recent bookings. It is putting one more Duquesne and one more Edgar Thomson furnace in blast and its ingot production crept up from 65 to a little over 67 per cent. of capacity this week.

Railroad buying is on a little better scale. The Rock Island placed 10,000 tons of rails with the Colorado mill and 8000 tons at Chicago, and at Chicago a suspended rail order for 10,000 tons has just been reinstated. The Southern Railway, which has been in the market for 37,000 tons, has given 16,000 tons of it to the Ensley mill. The Chicago & Western Indiana has bought 2000 tons and the Pittsburgh & Shawmut 1500 tons and Chicago orders for girder rails amount to 5000 tons.

Good requisitions for spikes are pending and in all track supplies the demand is better.

In eastern Pennsylvania a 30,000-ton contract for axle billets and spring steel (the former a bar mill product) has just been divided between Pittsburgh mills.

Structural items of special moment are the Metropolis bridge of the Illinois Central near Paducah, Ky., 19,000 tons, which is soon to be awarded, and the Kansas City terminal, 18,000 tons, on which there is active figuring.

The bar iron scale settlement gives the workmen a 25c. advance in puddling, or to $5.50, on a 1c. basis, with decreasing increments for higher prices for bars, until at 1.25c. the puddling rate is $6, as before.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	July 15, 1914.	July 8, 1914.	June 17, 1914.	July 16, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.75	$14.75	$14.75	$15.50
No. 2, Valley furnace...	13.00	13.00	13.00	13.85
No. 2 Southern, Cin'ti...	13.25	13.25	13.50	13.75
No. 2, Birmingham, Ala.	10.00	10.00	10.25	10.50
No. 2, furnace, Chicago*	13.75	13.75	13.50	14.75
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.00
Basic, Valley furnace...	13.00	13.00	13.00	14.35
Bessemer, Pittsburgh....	14.90	14.90	14.90	16.65
Malleable Bess., Ch'go*.	14.00	14.00	13.75	14.50
Gray forge, Pittsburgh..	13.65	13.65	13.65	14.65
L. S. charcoal, Chicago.	15.75	15.75	15.75	15.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh.	19.00	19.00	19.50	26.50
O.-h. billets, Pittsburgh..	19.00	19.00	19.50	26.50
O.-h. sheet bars, P'gh...	20.00	20.00	20.50	27.50
Forging billets, base, P'gh.	25.00	25.00	25.00	34.00
O.-h. billets, Phila.....	21.90	21.90	22.40	28.00
Wire rods, Pittsburgh...	24.50	24.50	24.50	28.50
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	12.25	12.25	12.75	14.00
Iron rails, Philadelphia..	15.00	15.00	15.00	17.50
Carwheels, Chicago.....	11.25	11.25	11.50	13.00
Carwheels, Philadelphia.	11.00	11.00	11.25	12.00
Heavy steel scrap, P'gh.	11.50	11.50	11.50	12.50
Heavy steel scrap, Phila.	10.25	10.50	10.50	11.25
Heavy steel scrap, Ch'go	9.75	9.75	9.75	10.50
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia.	12.00	12.00	12.00	13.00
No. 1 cast, Ch'go (net ton)	9.75	9.75	9.75	10.75
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.17½	1.17½	1.17	1.42½
Iron bars, Pittsburgh...	1.25	1.25	1.25	1.65
Iron bars, Chicago.....	1.05	1.00	1.05	1.50
Steel bars, Pittsburgh...	1.10	1.10	1.10	1.40
Steel bars, New York...	1.26	1.26	1.26	1.56
Tank plates, Pittsburgh.	1.10	1.10	1.10	1.45
Tank plates, New York..	1.26	1.26	1.26	1.61
Beams, etc., Pittsburgh..	1.10	1.10	1.10	1.45
Beams, etc., New York..	1.26	1.26	1.26	1.61
Skelp, grooved steel, P'gh	1.15	1.15	1.15	1.45
Skelp, sheared steel, P'gh	1.20	1.20	1.20	1.50
Steel hoops, Pittsburgh..	1.25	1.25	1.25	1.60
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.80	1.80	1.80	2.25
Galv. sheets, No. 28, P'gh	2.75	2.75	2.75	3.35
Wire nails, Pittsburgh..	1.50	1.50	1.50	1.70
Cut nails, Pittsburgh....	1.55	1.55	1.55	1.65
Fence wire, base, P'gh...	1.30	1.30	1.30	1.55
Barb wire, galv., P'gh...	1.90	1.90	1.90	2.20
Coke, Connellsville,				
Per Net Ton at Oven:	July 15, 1914.	July 8, 1914.	June 17, 1914.	July 16, 1913.
Furnace coke, prompt...	$1.75	$1.75	$1.75	$2.50
Furnace coke, future....	1.90	1.85	1.85	2.50
Foundry coke, prompt...	2.25	2.30	2.30	2.75
Foundry coke, future....	2.35	2.40	2.50	3.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Metals,

per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	*13.87½*	14.00	14.12½	14.50
Electrolytic copper, N. Y.	*13.62½*	13.75	13.87½	14.12½
Spelter, St. Louis.....	4.85	4.85	4.95	5.15
Spelter, New York.....	5.00	5.00	5.10	5.30
Lead, St. Louis.....	3.75	3.75	3.80	4.20
Lead, New York.....	3.90	3.90	3.90	4.35
Tin, New York.....	*31.50*	32.00	30.05	40.00
Antimony, Hallett's, N. Y.	6.75	6.75	6.87½	7.75
Tin plate, 100-lb. box, P'gh	$3.30	$3.30	$3.30	$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c. to 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10....	.30
Gauges under No. 10 to and including No. 12..	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft., to 2 ft., inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.10c. to 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.30 to $1.35; galvanized, $1.70 to $1.75. Galvanized barb wire and fence staples to jobbers, $1.90 to $1.95; painted, $1.50 to $1.55. Wire nails to jobbers, $1.50 to $1.55. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized ...	1.95	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, $24.50 to $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜...	73	52½	⅛ and ¼.....	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	77	68½	1¼	56	45
2½ to 6.....	79	70½	1½	67	56
7 to 12.....	76	65½	2	68	58
13 to 15.....	53	..	2½ to 4.....	70	61
			4½ to 6.....	70	61
			7 to 12	68	58

Reamed and Drifted

1 to 3, butt....	78	69½	1 to 1½, butt...	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap....	77	68½	1¼, lap	54	43
			1½, lap	65	54
			2 lap	68	56
			2½ to 4, lap....	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜...	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½.....	77	70½	¾ to 1½.....	71	62
2 to 3	78	71½	2 and 2½.....	72	63

Lap Weld, extra strong, plain ends

2	74	65½	1½	65	59
2½ to 4.....	76	67½	2	66	58
4½ to 6.....	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6.....	69	60
9 to 12	63	52½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	56½	½	57	49
¾ to 1½.....	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½.....	62	54

Lap Weld, double extra strong, plain ends

2	64	57½	2	55	49
2½ to 4.....	66	59½	2½ to 4.....	60	54
4½ to 6.....	65	58½	4½ to 6.....	59	53
7 to 8	58	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.....	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.....	49
2½ and 2¾ in.....	65	2¼ in.	45
3 and 3¼ in.....	70	2½ to 2¾ in.....	54
3½ to 4½ in.....	72	3 and 3¼ in.....	57
5 and 6 in.....	65	3½ to 4½ in.....	60
7 to 13 in.....	62	5 and 6 in.....	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.30
Nos. 9 to 10	1.35
Nos. 11 and 12.....	1.40
Nos. 13 and 14.....	1.45
Nos. 15 and 16.....	1.55

Box Annealed Sheets, Cold Rolled

Nos. 10 and 11.....	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14.....	1.50 to 1.55
Nos. 15 and 16.....	1.55 to 1.60
Nos. 17 to 21.....	1.60 to 1.65
Nos. 22 and 24.....	1.65 to 1.70
Nos. 25 and 26.....	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11.....	1.75 to 1.80
No. 12	1.85 to 1.90
Nos. 13 and 14.....	1.85 to 1.90
Nos. 15 and 16.....	2.00 to 2.05
Nos. 17 to 21.....	2.15 to 2.20
Nos. 22 and 24.....	2.30 to 2.35
Nos. 25 and 26.....	2.45 to 2.50
No. 27	2.60 to 2.65
No. 28	2.75 to 2.80
No. 29	2.90 to 2.95
No. 30	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., July 14, 1914.

Further improvement is seen in the iron and steel situation, and it is generally conceded that the market passed a turning point in June and is now on the road to recovery with prospects that a period of real prosperity of perhaps several years' duration will soon begin. The attitude of buyers is becoming more favorable toward commitments for forward delivery, and hundreds of thousands of tons of steel products could be sold in a few days on contracts for future specification and delivery if the mills were willing to accept to-day's prompt shipment prices, but they are asking advances for forward delivery and this restricts the volume of contracting. Each week, however, a larger tonnage is put under contract, usually at slight advances. Thus it may be noted that one large interest has sold between 15,000 and 20,000 tons of steel bars in contracts for third quarter at 1.15c., Pittsburgh. On the whole the mills do not expect much advance in prices this year, but are asking moderate advances because the present prices for prompt shipment are practically profitless. Steel mill operations in the Pittsburgh district proper are at fully 70 per cent. of capacity, but taking nearby districts into account the average is nearer 65 per cent.

Pig Iron.—Since the blowing out of Cherry Valley furnace at Leetonia week before last merchant pig-iron production in the Pittsburgh Valley district has been stationary and it looks as though the next change would be in the direction of an increase. Shenango Furnace No. 1, which has been out for relining and enlargement, will likely blow in shortly, and it is reported that another furnace is figuring on going into blast not because it wishes to sell iron on the present market but because it would be willing to accumulate some iron against an expected improvement in the market, the present production cost being regarded as low. Demand for foundry iron keeps up in a moderate way, with sales at unchanged prices. Several of the smaller steel companies are taking more interest in basic iron and one Allegheny River plant has just purchased 6000 tons at the reported price of $13.90, delivered. We quote: Bessemer, $14; basic, malleable and No. 2 foundry, $13; gray forge, $12.75, all at Valley furnaces, with 90c. freight to Pittsburgh.

Billets and Sheet Bars.—Consumers are covering their requirements from month to month and no large contracts are being made. There are rumors that some billets and sheet bars are being offered at lower prices f.o.b. Youngstown than have formerly been quoted. We quote Bessemer and open-hearth billets at $19 and Bessemer and open-hearth sheet bars at $20, f.o.b. maker's mill, Pittsburgh or Youngstown. We quote forging billets at $25 for desirable orders of one size and up to but not including 10 x 10 in., regular extras being charged for larger sizes. On carload orders forging billets are held at $26. We quote axle billets at $23 for desirable orders and $24 for small lots, f.o.b. Pittsburgh.

Ferroalloys.—The English makers have not dropped their price of $38, Baltimore, for ferromanganese since representatives of the German producers have offered their material at $37, but sales of both products are light. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Muck Bar.—Some of the local iron mills have been idle, although the Amalgamated Association would have permitted them to work pending the adjustment of the wage scale for the twelvemonth beginning July 1. The scale having been adjusted last Friday, the mills are in position to resume. The settlement advances the puddling rate 25c. when bar iron is 1c.; 20c. on 1.05c.; 15c. on 1.10c.; 10c. on 1.15c., and 5c. on 1.20c., leaving other rates unchanged. Muck bar remains quotable at $27, f.o.b. Pittsburgh.

Structural Material.—Local mills are able to make up very fair specifications from week to week, and the Carnegie mills are busier than for some time, as the American Bridge Company has lately had some good bookings. Prices on structural shapes are firmly maintained. We quote beams and channels, 15-in. and under, at 1.10c. for desirable orders and prompt shipment and 1.12½c. to 1.15c. for smaller orders, f.o.b. Pittsburgh.

Plates.—The Forged Steel Wheel Company, Butler, Pa., has entered the market for plate orders, having completed a mill to roll plates up to 42 in. wide. The Carnegie Steel Company has received a large batch of plate specifications since the first of the month, against car orders which were entered in June, and the local plate mills are likely to run somewhat better this month and next than they did in the two preceding months. The market is regarded as steadier than 30 days ago, as 1.10c. is the recognized minimum, while some time ago there were not infrequent modifications of this price. On small lots, and contracts for third quarter we quote 1.12½c. to 1.15c., f.o.b. Pittsburgh.

Steel Rails.—The Steel Corporation's allotment of the Pennsylvania rail tonnage is 44,000 tons, as already announced, and this is all for the Lines West. The division of the tonnage between the Carnegie and Illinois steel companies is left to the Steel Corporation management, and the mills can start rolling the 100-lb. sections at once. The formal order will be received within a few days and will determine what proportion of the tonnage is to be in the new 120-lb. section. We quote light rails rolled from billets as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots these prices might be shaded.

Steel Wheels.—A fair run of small orders for steel wheels is being received, almost entirely for passenger cars, as the railroads are economizing at the moment and are not using steel wheels on freight cars to any extent. We quote 33-in. engine truck wheels at $21; 36-in. engine truck wheels, $22; 33-in. tender wheels, $17; 36-in. passenger and tender wheels, $19 to $19.50; 33-in. freight car wheels, $14.50 to $15, f.o.b. Pittsburgh.

Skelp.—Pipe mills are begininng to take more interest in contracts for skelp for forward delivery as they believe prices have now reached bottom. The small lot business is about the same as formerly. We quote: Grooved steel skelp, 1.15c. to 1.20c.; sheared steel skelp, 1.20c. to 1.25c.; grooved iron skelp, 1.50c. to 1.55c.; sheared iron skelp, 1.60c. to 1.65c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—The market continues quiet but shows slightly more signs of life, and the mills are more disposed to ask advances on forward deliveries. We quote Bessemer, open-hearth and chain rods at $24.50 to $25, f.o.b. maker's mill, Pittsburgh, prices depending on desirability of the order.

Iron and Steel Bars.—As already noted, one of the mills has booked between 15,000 and 20,000 tons of steel bars, on third-quarter contracts, at 1.15c., and this is the regular asking price to the ordinary trade, while on prompt orders 1.10c. is done. It is thought that most of the agricultural implement bar contracts will be closed before the end of the month. We quote steel bars at 1.10c. for desirable orders and prompt shipment, and 1.12½c. to 1.15c. for third quarter delivery. We quote iron bars, made nearly entirely from muck bar, at 1.25c. f.o.b. maker's mill, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¾-in. and over $1; ½ to 11/16-in., $1.50; under ½ in., $2.50 per net ton. These extras are not always observed.

Hoops, Bands and Cotton Ties.—The receivership of the Alton Steel Company, Alton, Ill., arranged last week, is a natural result of the sharp competition which this new producer started when it entered the field late last year. Since that time hoops have been lower in price, relative to steel bars, than ever before. The other hoop makers are hopeful that the market will now firm up to 1.30c. The regular market has lately been 1.25c. but that figure has been shaded by some mills. We quote bands at 1.10c. and cotton ties at 65c., Pittsburgh.

Sheets.—Buying of sheets for prompt shipment is about the same as formerly, while there is still more interest in contracts. The mills refuse to book forward deliveries except at advances, and buyers are becoming more ready to close on this basis. A number of contracts have been closed at successive advances in accordance with the period of delivery, and some specialties running into next year have been booked at several dollars a ton advance in the base price. One Valley mill is talking about shutting down for the entire month of August, asserting that present selling prices for prompt shipment are more than $2 a ton below the cost of production and suggesting that it is cheaper to buy from competitors to fill orders than to run a mill. We quote Nos. 9 and 10 blue annealed sheets at 1.35c.; No. 28 Bessemer black, 1.80c. to 1.85c.; No. 28 galvanized, 2.75c. to 2.80c.; No. 28 black plate, tin mill sizes, H. R. and A., 1.85c.; Nos. 29 and 30, 1.90c. The above prices are in carload lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—It is reported that the McKeesport Tin Plate Company will soon begin active work on the construction of 18 additional mills, which have been in contemplation for some time. The market is quiet, but the mills are booking a little business from time to time and are still receiving a fair amount of specifications on old contracts. The leading interest is operating about 90 per cent. of its tin mills, while the independents are not doing so well, their average being about 75 per cent. We quote 100-lb. 14 x 20 coke plates at $3.30 to $3.40 and 100-lb. 14 x 20 terne plates at $3.20 to $3.30, f.o.b. Pittsburgh.

Shafting.—Consumers are beginning to take a little more interest in shafting for forward delivery, and the market outlook is regarded as improved. Buying for prompt shipment continues light, however, and prices are no steadier than they were. On desirable orders 66 to 67 per cent. off the list is being done regularly, approximately the lowest price on record, while small lots go at 63 to 64 per cent. off, delivered in base territory.

Spikes.—The Pennsylvania Railroad is expected to place some orders for spikes, now that it has ordered 100,000 tons additional of rails, but unlike most roads it will not contract at once for all the spikes needed for these rails, preferring to place orders from time to time as the spikes are needed. Demand for spikes is light all along the line but is better for small spikes than for railroad spikes. Prices are quite well held. We quote standard sizes of railroad and boat spikes at $1.40 and small railroad and boat spikes at $1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh.

Merchant Steel.—Demand for even the most seasonable lines of merchant steel is light and has shown no perceptible improvement in the past fortnight, and prices continue rather irregular. On small lots for prompt shipment we quote: Iron finished tire, ½ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Wire Products.—While no improvement in demand for wire products is observed here, contracts for the fall trade will soon be entered. It is stated that there are no stocks anywhere in the country, even the mills not having made up any stocks to speak of in this dull season and it is pointed out that when the demand starts it may come in a rush. We quote wire nails, $1.50 to $1.55; plain annealed wire, $1.30 to $1.35; galvanized barb wire and fence staples, $1.90 to $1.95; painted barb wire, $1.50 to $1.55, all f.o.b. Pittsburgh, actual freight added to point of delivery, terms, 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at $1.55 to $1.60 f.o.b. Pittsburgh.

Nuts, Bolts and Rivets.—There is a moderate run of specifications on contracts lately placed and on the whole the trade shows a slight improvement, though conditions are still far from satisfactory to producers. We quote button-head structural rivets in carload lots at 1.50c., and in small lots at 1.60c.; cone-head boiler rivets, 1.60c. in carload lots and 1.65c. in small lots, with terms 30 days net, 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered with a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blanked and tapped	$6.30 off list
Hexagon nuts	$7.20 off list
C.P.C. and r sq. nuts, blanked and tapped	$6.00 off list
Hexagon nuts, ⅝ and larger	$7.20 off list
Hexagon nuts, smaller than ½ in.	$7.80 off list
C.P. plain square nuts	$5.50 off list
C.P. plain hexagon nuts	$5.90 off list
Semi-fin. hex. nuts, ½ in. or under	85, 10 & 10% off
Semi-fin. hex. nuts, ⅝ in. and larger	85 & 5% off
Rivets, 7/16 x 6½, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Standard Pipe.—Bookings for pipe thus far this month are approximately the same as in the same period in June, when there was a very substantial increase over May, and an increase even over the average of the five months ending May. Prices for standard pipe are well held, and there is less irregularity on specialties.

Boiler Tubes.—While boiler tubes are moving somewhat better than for the past month or two, there has beeen no marked improvement in the past week, and prices continue to be shaded about as much as formerly.

Old Material.—The mills are showing only a moderate amount of interest in the scrap market and are not willing to take hold in such a way as to give the dealers much opportunity to trade, as prices offered by the mills would not enable the dealers to pick up any material at a profit. The heavy melting steel of the Pennsylvania Railroad, allotted last week, is believed to have gone to a consumer at $11.55, Pitcairn, or $12, delivered to a Pittsburgh mill. There is a moderate movement in borings and turnings, demand absorbing all that is offered at going prices. An embargo was placed last Friday on scrap destined for the Youngstown Sheet & Tube Company. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery		$12.00
Ordinary steel melting scrap	$11.50 to	11.75
Compressed side and end sheet scrap	11.00 to	11.25
No. 1 foundry cast	11.50 to	11.75
No. 2 foundry cast	10.25 to	10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.25 to	8.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.75 to	13.00
No. 1 railroad malleable stock	11.00 to	11.25
Railroad grate bars	10.25 to	10.50
Low phosphorus melting stock	14.25 to	14.50
Iron car axles	22.50 to	23.00
Steel car axles	15.50 to	16.00
Locomotive axles, steel	20.00 to	20.50
No. 1 busheling scrap	10.25 to	10.50
No. 2 busheling scrap	7.25 to	7.50
Machine shop turnings	7.75 to	8.00
Old carwheels	11.25 to	11.50
Cast-iron borings	8.25 to	8.50
†Sheet bar crop ends	12.00 to	12.25
Old iron rails	13.75 to	14.00
No. 1 railroad wrought scrap	11.50 to	11.75
Heavy steel axle turnings	8.50 to	8.75
Heavy breakable cast scrap	12.00 to	12.25

†Shipping point.

Coke.—The inquiries for furnace coke for delivery over second half have appeared in the market, one being on account of the expiration of an old contract, while the other is for a furnace now idle and which may possibly be blown in. On the whole the furnace coke market is very dull and no important activity is

expected until toward the close of the month, when some consumers who covered for July at low prices will be in the market again. Foundry coke is moving fairly well and prices for the best grades are firmly maintained. We note a contract for 18 cars weekly over the twelvemonth taken at the full market price for the best grade. We quote: Prompt furnace, $1.75 to $1.80; contract furnace, $1.90 to $2; prompt foundry, $2.25 to $2.35; contract foundry, $2.35 to $2.50, per net ton at oven. The production of coke in the Connellsville and lower Connellsville region in the week ended July 4, as reported by the Connellsville Courier, was 259,252 net tons, a decrease of 2301 tons.

Chicago

CHICAGO, ILL., July 15, 1914.—(*By Wire.*)

The optimism of market observers is dependent upon whether they see in the present better buying and contracting the beginning of a campaign of expansion of business or only a conservative covering of urgent and last-half requirements. There are those who point out that consumers, while they are willing to extend their purchases as far into the future as possible because of advantageous prices, still are not buying at all heavily for any particular period. Specifications for shapes and plates are holding up to the improved level and a degree of firmness has been injected into quotations. Concessions obtainable without great difficulty a fortnight ago can no longer be secured, and 1.10c., Pittsburgh, is the general minimum. Architectural contracts for steel were not important last week, but the purchase of a desirable aggregate of cars has become increasingly indefinite. Contracting for both hard and soft steel bars by the implement interests is proceeding in a routine fashion. Apparently no particular occasion for haste in closing is recognized by buyers, and at this writing some of the largest contracts are still unplaced. The buying of pig iron during the week suggests no general change in the foundry situation. A sale of 2000 tons of Southern iron, following the rate reduction, is of interest, while the merchant producers in this market note with some concern further sales by a Chicago steel company, including 10,000 tons of basic to a St. Louis melter and 500 tons of high-silicon high-manganese iron to a local consumer at attractive prices. The sale of 9500 tons of cast-iron pipe at Detroit has been consummated.

Pig Iron.—A local stack regularly producing steelmaking irons has sold 10,000 tons of basic to a melter at St. Louis, the price representing no material improvement over previous quotations for similar transactions. The same producer marketed 500 tons of high silicon iron, which is off grade for its own purposes, on the basis of $13, f.o.b. furnace. Following the reduction of the Southern pig iron freight rate a sale of 2000 tons for last-half delivery is noted. The aggregate of transactions of more routine character shows no particular increase of interest on the part of melters, but a fairly steady buying of Northern iron continues in lots of moderate size. Local furnaces are making practically no exceptions to the $14, f.o.b. furnace, basis for No. 2 foundry and $10.25, Birmingham, continues to be the ruling price for Southern grades. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	14.50 to 15.00
Northern coke foundry, No. 2	13.75 to 14.25
Northern coke foundry, No. 3	13.50 to 14.00
Southern coke, No. 1 f'dry and 1 soft	15.10 to 15.35
Southern coke, No. 2 f'dry and 2 soft	14.60 to 14.85
Malleable Bessemer	14.00 to 14.25
Standard Bessemer	17.00
Basic	13.25 to 13.50
Low phosphorus	21.00 to 21.75
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

(*By Mail*)

Rails and Track Supplies.—Except for their purchases of spikes and track bolts which have held up surprisingly well during the last few months, the railroads are still very slow in authorizing expenditures for track work. The past week brought out no new sales of rails of importance. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $25.50 to $26, f.o.b. mill net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—A number of small contracts for fabricated steel comprised the lettings reported for last week. There was included 135 tons for the Des Moines (Ia.) Electric Company to the Des Moines Bridge & Iron Company; 300 tons for a viaduct, Denver, Col., to the Omaha Structural Steel Company; 239 tons, the Elks' Home, Bedford City, Va., to the Virginia Bridge & Iron Company; 142 tons for a high school, Chicago, to the South Halstead Street Iron Works; 131 tons for the Arthur Iron Mining Company, Chisholm, Minn., to the American Bridge Company; 125 tons, for the Emporium Building, St. Paul, Minn., and 152 tons for a bank building, Winona, Minn., to the St. Paul Foundry Company; 752 tons for the David Stott store building Detroit, Mich., to the American Bridge Company; 161 tons, for a hotel at Muscatine, Ia.; 151 tons for a bridge at Jefferson, Wis., and 125 tons for the Southern Cotton Oil Company at Memphis, Tenn. The week's specifications for plain material from mill were in slightly better volume, the improved conditions being reflected also in an increased firmness in prices. The market now seems to be quite generally at the basis of 1.10c., Pittsburgh. It is possible that 1.25c., Chicago, might still be done, on a handsome specification. The inquiry for new cars mentioned a week ago has grown more definite and formal requests for quotations are expected shortly. For plain material from mill we quote 1.28c., Chicago.

For Chicago delivery of structural shapes from jobbers stocks we quote 1.75c.

Plates.—Plate business is somewhat better in volume but orders are not yet sufficiently plentiful to continuously engage mill capacity. The somewhat firmer price situation noted with respect to structural material is also applicable to plates. We quote for Chicago delivery from mill 1.28c.

We quote for Chicago delivery of plates from jobbers stock 1.75c.

Sheets.—The activity of sheet users in contracting may be gauged by the fact that the leading independent mill at Chicago now has third quarter business on its books that will carry it into August. Some contracts have been taken also extending into the fourth quarter, but for this latter delivery an advance of $2 a ton has been asked. We continue to quote for Chicago delivery from mill: No. 10 blue annealed, 1.48c. to 1.53c.; No. 28 black, 1.93c. to 1.98c.; No. 28 galvanized, 2.88c. to 2.93c.

We quote for Chicago delivery from store as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.85c.; No. 28 black, 2.35c. to 2.45c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—The contracting for bars by the implement interests lacks this year the simultaneous action which ordinarily characterizes the closing of this business. A few contracts were placed last week, but some of the more important from the standpoint of tonnage remain to be closed. While from point of number the major part of this business has been placed, from point of tonnage the larger business is yet to be closed. There is a fair demand for prompt shipment material, but the low price of bar iron militates against the use of steel in some instances where specifications permit. The Western Association of Bar Iron Manufacturers has reached an adjustment of its wage scale and operations were generally resumed this week. A slight stiffening in price is noted in conjunction with the accumulation of business during the idleness of the mills and 1.05c. now seems to be the minimum quotation. Pier No. 35 at San Francisco is to be built of reinforced concrete.

We quote for mill shipments as follows: Bar iron, 1.05c. to 1.10c.; soft steel bars, 1.28c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—The implement interests who have closed for their bars have been placing their bolt contracts at the same time. Prices do not seem to be as irregular and our minimum quotations represent the basis for the most desirable business only. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; machine bolts up to ⅜ x 4 in., rolled thread, 85-10; cut thread, 85-5; larger sizes, 80-10; coach screws, 85-15; hot pressed nuts, square head, $6.60 off per cwt.; hexagon, $7.60 off per cwt. Structural rivets, ½ to ¼ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅜ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Hoops and Bands.—The very unsatisfactory condition of the market both as to volume of business and prices has proven too great a handicap for the Southern Illinois mill and it is now down pending an adjustment of its affairs. In the direction of hoops and bands the market situation has shown little, if any, improvement. We quote for Chicago delivery of bands 1.28c. and for hoops 1.38c.

Cast-Iron Pipe.—Action favorable to the use of cast-iron pipe has finally been taken at Highland Park, Mich., and the United States Cast Iron Pipe & Foundry Company has been awarded the contract for about 9500 tons. The letting of 1200 tons of pipe at Caspar, Wyo., is scheduled for July 20 and at Michigan City, Ind., award is to be made of 700 tons of 42 in. pipe on Wednesday. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $26; 6 to 12 in., $24; 16 in. and up, $23.50, with $1 extra for gas pipe.

Old Material.—Melters of scrap in this market are exhibiting only a mild though somewhat livelier interest in scrap purchases. There are evidences of a willingness to cover requirements into the nearby future where this can be done on the basis of current quotations. Instances are still frequent, however, of tonnages whose disposal is attended with considerable difficulty. Railroad scrap offerings include 2700 tons by the Santa Fé and 600 tons by the Soo Line. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$12.25 to $12.75
Old steel rails, rerolling	11.50 to 11.75
Old steel rails, less than 3 ft.	10.25 to 10.50
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	11.25 to 11.50
Heavy melting steel scrap	9.75 to 10.00
Frogs, switches and guards, cut apart	9.75 to 10.00
Shoveling steel	9.25 to 9.50
Steel axle turnings	6.75 to 7.25

Per Net Ton

Iron angles and splice bars	$12.00 to $12.25
Iron arch bars and transoms	12.00 to 12.25
Steel angle bars	8.75 to 9.25
Iron car axles	16.25 to 16.75
Steel car axles	11.75 to 12.25
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.75 to 9.00
Cut forge	8.50 to 8.75
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.25 to 9.75
Locomotive tires, smooth	9.50 to 9.75
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50
No. 2 busheling	6.00 to 6.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.75 to 10.25
Stove plate and light cast scrap	8.75 to 9.00
Grate bars	8.50 to 8.75
Railroad malleable	9.00 to 9.25
Agricultural malleable	8.00 to 8.25
Pipes and flues	6.50 to 6.75

Wire Products.—Indications point to a campaign to get the jobbing and manufacturing interests under cover on contract at the present prices. Inasmuch as such action is followed ordinarily by an advance in price, there is some reason for the emphasis which is being placed upon the attractiveness of current quotations. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.53; wire nails, $1.68 to $1.73; painted barb wire, $1.68 to $1.73; galvanized, $2.13 to $2.18; polished staples, $1.68 to $1.73; galvanized, $2.03 to $2.08, all Chicago.

Philadelphia

PHILADELPHIA, PA., July 14, 1914.

Irregularity in demand is pronounced in this territory, and for this reason it is difficult to measure what actual progress has been made toward satisfactory conditions, although the better feeling recently noted still exists. This week a considerable betterment in sheets can be reported, nearby mills having received orders which will keep them running full for some days. Steel bars, on the other hand, have not been so active, although one maker which has felt this lesser demand had the loss made up by an increased request for steel pipe. The plate trade has not got away from its unsatisfactory state, and billets, shapes and the heavier products generally show no betterment. This month's movement in pig iron averages well with that of the same time last month, and contracts for foundry coke are being made with fair frequency, although the tonnages involved are not big individually. Some apprehension is expressed because of the decrease this season of 6,500,926 tons in Lake ore shipments as compared with the same time last year. If the ratio of smaller shipments should be kept up too long and the demand should be heavy next winter it is predicted that the pocketbooks of consumers will be hit. An early effect of the recently announced freight rates on Alabama and Virginia pig iron has been a few deferments of shipments by consumers who hope to save by holding off deliveries until August 15. Old material has been adversely affected by heavy offerings by the railroads. In no direction do prices show any improvement.

Iron Ore.—Demand in this district is dormant. Deliveries of foreign ore on contract were a trifle lighter last week, consisting of but 6566 tons from Sweden, but this has no significance. The stock of Swedish ore now here is considerably in excess of present needs.

Pig Iron.—Sales and inquiries have been irregular, some sellers reporting both to have been lighter than in the preceding week, while others say that the rather good average of June is being maintained. In that month the stocks of pig iron at eastern Pennsylvania furnaces increased a few hundred tons, while the increase in June orders was about double the amount which was added to stocks. Practically all of the activity in which the general trade has participated has been in foundry iron, though a Harrisburg company has contracted for 5000 tons of basic to be supplied by three sellers, delivery to be made at the rate of 1000 tons a month. An exceptionally good price was obtained, but the circumstances were exceptional and the actual market is not indicated. There also has been the usual taking of small lots of standard low phosphorus, principally by makers of automobile castings. In a general way, prices have held firm, although the talk of price cutting in a few transactions points to at least occasional concessions, an impression which is furthered by the assertions of close buyers, that they have obtained or can get lower prices than those quoted. One definite effect of the recent decisions by the Interstate Commerce Commission, lowering the freight rates on Alabama and Virginia iron, has already been felt. The new rate on Virginia iron will mean an average difference of about 25c. per ton in this district, and already a few consumers have asked that shipments be deferred until after August 15, when the rate becomes effective, to get the additional advantage. Reference to prevailing prices for Virginia iron delivered here will show that 25c. per ton will make but

little difference as regards competition except in the contingency that Northern iron advances several points, permitting the Virginia iron to come actively in the market earlier and to stay there longer when a decline comes. The rates on Alabama iron are yet to be fixed for this district, although the changes affecting New England and Western points have been ordered. Those for this territory are to be made by the railroads to conform with the announced decisions in a manner satisfactory to the Interstate Commerce Commission. Because of the lower costs at Alabama furnaces, any substantial reduction in the present freight rates of from $4.80 to $5 per ton to points in this territory will enable Southern iron to compete more actively with eastern Pennsylvania furnaces. The trade is not in unison as to the definite working out of the new rates. Representatives of Virginia interests exclusively say that the cost of transporting their product should have been reduced more, and that they would have been as well satisfied with no decision at all at this time. Among the inquiries before the trade is one for 10,000 tons of Southern iron for July and August delivery, for export. A sale of 350 tons of Southern iron realized $10.50. Inquiries generally, and sales, also, have not involved large quantities. A good part of the interest has been in high silicon iron, and several hundred tons have been sold in parcels. The principal cast iron pipe interest has placed orders for over 5000 tons of Southern iron. The following prices are for standard brands delivered to buyers' yards:

Eastern Penna. No. 2 X foundry	$14.75 to $15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2 X foundry	15.55 to 15.75
Virginia No. 2 plain	15.30 to 15.55
Gray forge	13.75 to 14.00
Basic	14.00
Standard low phosphorus	20.50 to 21.00

Ferroalloys.—Except for the occasional sale of a carload there is no activity in 80 per cent. ferromanganese. The English product is quoted at $38, seaboard, and the German at $37. Imports last week were 50 tons from Germany and 415 tons from England. The quotation for 50 per cent. ferrosilicon is unchanged at $71 to $73, Pittsburgh, depending on quantity.

Bars.—The miscellaneous demand for steel bars fell off a little in the past few days, although some good orders were placed and others are pending. The Sheldon Axle Company, Wilkes-Barre, Pa., is reported to have closed its contract covering requirements for about 30,000 tons of spring steel and axle billets. Three railroads which are in the market will require about 9000 tons. For prompt business 1.25c., Philadelphia, is being done on steel bars, while on contracts 1.30c. is quoted. A sale involving 100 tons of concrete bars was closed at 1.15c., Philadelphia. Iron bars are being ordered to a somewhat better extent, but prices are unchanged at 1.17½c. to 1.20c., Philadelphia.

Structural Material.—Conditions have not changed in this district, and the dearth of new business is as great as ever, with the trade hampered by price uncertainties. On current business 1.25c., Philadelphia, equal to 1.10c., Pittsburgh, is easily done. The contract for the extension to the Traymore Hotel at Atlantic City, which is to be either of steel or concrete construction, has not been placed yet, though bids are in on both forms of construction. A proposed extension to the Hotel Rudolf, Atlantic City, is being watched with interest. There is some talk that the construction of the power plant of the Philadelphia Electric Company, which was referred to a week ago, may be held up for a time. It is reported that 450 tons of steel shapes required for a viaduct at Bethlehem, Pa., has been awarded to the Pennsylvania Bridge Company.

Plates.—There is little or no change to report, with orders of the small, miscellaneous kind. Prices range from 1.25c. to 1.30c., Philadelphia, the latter being asked where contracts are entered. A new mill in this district is now in operation on orders in hand, although not much is seen ahead.

Billets.—Like other heavy products, billets are dull, though a better demand for sheets should soon increase their production. Local makers are asking $21.90, Philadelphia, for open-hearth rolling billets, although this is 50c. higher than the Pittsburgh basis. Forging steel runs $4 to $5 a ton higher.

Sheets.—The market has picked up considerably and suddenly, giving mills in this district sufficient work to keep them running full for several days to come. The demand is from miscellaneous buyers and for prompt delivery, and is believed to have been inspired by the disclosing of extremely low stocks in the course of midsummer inventories. The quotation for No. 10 blue annealed is unchanged, at 1.50c., Philadelphia.

Coke.—The demand continues fair, especially for foundry coke, though a majority of the transactions involve smaller quantities than sellers like to see. Quotations are about $2.40 to $2.70 per net ton at oven for foundry coke and $1.75 to $2 for furnace. Freight rates to this city from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—Railroad scrap lists now being received by dealers are close to the heaviest in their history, while the roads are asking that material they have sold be taken promptly, all of which has resulted in a break in No. 1 railroad wrought, which is now quoted at $12 to $12.50, a reduction of 50c. In some cases dealers have declined to take some of the material offered. No. 1 heavy melting steel scrap is off 25c. also. Some good sales have been made, and the chance for activity looks better. The market for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to $1.35, per gross ton, is as follows:

No. 1 heavy melting steel	$10.25 to $10.75
Old steel rails rerolling	12.00 to 12.50
Low phosphorus heavy melting steel Scrap	14.00 to 14.50
Old steel axles	14.00 to 14.50
Old iron axles (nominal)	20.00 to 21.00
Old iron rails	15.00 to 15.50
Old carwheels	11.00 to 11.50
No. 1 railroad wrought	12.00 to 12.50
Wrought-iron pipe	9.25 to 9.75
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Wrought turnings	7.75 to 8.25
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.00 to 8.50
Stove plate	8.25 to 8.75
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, July 14, 1914.

Iron Ore.—A few sales are being made in small lots. One ore firm reports the sale of 70,000 tons in three lots during the week. Shipments are about keeping up with the June pace and there are more boats in commission than are needed for the ore trade. We quote prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—The merchant pig-iron production of the Lake furnaces is being further reduced. Corrigan, McKinney & Co. blew out one of their River furnaces in Cleveland July 8 and Perry furnace of Pickands, Mather & Co. will go out of blast late this week. The market is quiet, but the foundry-iron melt is improved slightly and there is a somewhat better feeling in the trade. One Cleveland furnace reports the sale of 7000 tons, 1000 of which was malleable iron and the remainder foundry iron. Cleveland furnaces are adhering to $13.75 for No. 2 foundry delivered here, being unwilling to shade that price to shut out competition of Valley furnaces. While the latter are generally quoting $13 as the minimum price this is being shaded 15c. a ton to bring iron into Cleveland, meeting the prices of Cleveland furnaces as noted last week. The general understanding of the recent decision of the Interstate Commerce Commission ordering a reduction in pig-iron rates from Alabama to Northern points is that the freight rate on Southern iron to all Ohio points will be reduced 35c. a ton. Northern producers feel that this reduction will make the competition of Southern iron considerably stronger than it has been in the past. While with the freight reduction Southern iron will cost more delivered in Cleveland at present prices than Northern iron this is not true of many Ohio shipping points, where the delivered price of Southern and

Northern iron will be practically the same. It is understood that the Wheeling Mold & Foundry Company, which recently purchased 35,000 tons of iron for delivery over two years, will use but a small portion of this iron in the East River tunnel segments in New York, but will resell the bulk of it and buy in its place low-grade iron, the round lot purchase of iron of fairly good quality having been made to protect the company from a possible advance in prices before the completion of its contract. Some spot shipment sales of Southern iron are reported at $10, but the general quotation is $10.25, Birmingham, for No. 2 for the last half, and furnaces are asking $10.50 for the last quarter. We quote, delivered Cleveland, as follows:

Bessemer	$14.90
Basic	$13.75 to 13.90
Northern No. 2 foundry	13.75
Southern No. 2 foundry	14.35 to 14.60
Gray forge	13.50
Jackson Co. silvery, 8 per cent. silicon	17.55
Standard low phosphorus, Valley furnace	20.25

Coke.—Shipping orders on foundry coke contracts have improved somewhat, indicating that foundries are getting a little busier than they have been. Some contracts are still being placed, but most consumers are under contract. Furnace coke is inactive. Foundry coke prices are not firm. Standard foundry coke is being offered at $2.30 to $2.50 per net ton at oven for delivery during twelve months, but most of the best known makes are bringing the latter price. Furnace coke is held at $1.75 for prompt shipment and $1.85 to $2 for contract.

Finished Iron and Steel.—The sentiment has improved and there is a slightly better volume of specifications. Some contracts for steel bars, plates and structural material are being made for the third quarter and last half. The prevailing price for the three lines of material for carload lots of spot shipment is 1.10c. This is the minimum price for steel bars for the third quarter. Quotations for the last quarter range from 1.15c. to 1.20c. The local structural situation has improved. Architects are working on preliminary plans for a building to be erected by the Union National Bank in Cleveland and another building project is a large office building planned by the East Ohio Gas Company. Action has been taken by the city for the elimination of the Nickel Plate grade crossing on the west side. This work is expected to take considerable steel for bridges. Fred R. Jones of Chicago was the low bidder for work in connection with the city filtration plant which will require 600 tons of sheet steel piling, but the contract has not yet been placed. Many of the Ohio boiler shops have contracted for their last half requirements of boiler plates at 1.15c. for the third quarter and 1.20c. for the fourth quarter. Sheets are unchanged at 1.80c. for No. 28 black and 2.80c. for No. 28 galvanized with an advance of $1 for the fourth quarter delivery. Bar iron is in light demand, with quotations unchanged at 1.20c., Cleveland, for local delivery. One of the Cleveland bar-iron mills has resumed operations. The demand for light rails, which has been dull for some time, has improved. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—Although considerable inquiry for bolt contracts is pending, buyers are not placing orders, apparently hoping to get further concessions in prices. Most rivet consumers are under contract. We quote structural rivets at 1.50c. and boiler rivets at 1.60c. for carload lots. Boiler rivets are not as firm as structural and the price is being shaded $1 a ton in some cases. We quote discounts as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h. p. nuts, blank or tapped, $6.30 off; hexagon h. p. nuts, blank or tapped, $7.20 off; c. p. c. and t. square nuts, blank or tapped, $6 off; hexagon, ⅝ in. and larger, $7.20 off; 9/16 in. and smaller, $7.80 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—The market appears in worse shape than at any previous time during the present dull spell. Prices, which have been practically stationary for some time, show a weakening tendency. Some mills are willing to buy scrap at the present low prices, but are unwilling to take shipments. One Cleveland mill has come in the market for heavy melting steel, but has reduced its price 50c. to $10. Borings are particularly weak, having declined 25c. a ton. Embargo has been declared against scrap for the Youngstown Sheet & Tube Company and the Brier Hill Steel Company so that very little scrap is being shipped into Youngstown and the Middletown embargo is still in force. We quote f.o.b. Cleveland as follows:

Per Gross Ton

Old steel rails, rerolling	$11.50 to $12.00
Old iron rails	13.00 to 13.50
Steel car axles	15.00 to 15.25
Heavy melting steel	10.00 to 10.50
Old carwheels	11.25 to 11.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	10.25 to 10.75
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton

Iron car axles	$17.75 to $18.25
Cast borings	5.25 to 5.75
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.25 to 8.50
No. 1 busheling, old	8.00
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	10.50 to 10.75
Stove plate	7.50 to 8.00

Buffalo

BUFFALO, N. Y., July 14, 1914.

Pig Iron.—The market is comparatively quiet with only a small amount of inquiry for the week, although there have been a fair number of small orders coming in including a few 200, 300 and 500 ton lots of foundry grades. No definite improvement is discernible in the general foundry trade which might be reflected in the purchase of pig iron. The minimum now held by Buffalo producers seems to be firm at $13 at furnace for any grade, for third quarter delivery. Some furnacemen ask 25c. above third quarter prices for fourth quarter delivery. We quote as follows for third quarter delivery f.o.b. furnace:

No. 1 foundry	$13.00 to $13.50
No. 2 X foundry	13.00 to 13.25
No. 2 plain	13.00
No. 3 foundry	13.00
Gray forge	13.00
Malleable	13.00 to 13.25
Basic	13.25 to 13.50
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

Finished Iron and Steel.—Some selling agencies report increased specifications for the week, principally for bars. June totals were ahead of May and July is keeping up with June. It is reported that unspecified balances on contracts which expired June 30 are being cancelled, and where new contracts have been taken sellers are insisting absolutely upon the application of the monthly quota clause, there being a feeling on the part of producers that bottom prices have been reached and they are not willing that users shall come in at the latter part of a contract term with specifications for monthly quota tonnages not taken at the proper time. Contracts for agricultural implement business are reported as coming in slowly. Prices remain as quoted last week at 1.15c. for third quarter contracts and 1.10c. for immediate specification. The local situation on wire products is quiet although there are some indications of improvement later. Bids go in to-morrow on structural steel, 100 tons for a parochial school for the Church of the Transfiguration, Buffalo, and on Thursday for 900 tons for a Y. M. C. A. building at Rochester. Bids are soon to be taken for a factory for the Taber Pump Company, Buffalo, requiring about 200 tons. The Lackawanna Steel Company has received an order from the Pennsylvania Railroad for 6000 tons of 100-lb. steel rails.

Old Material.—The market is dull with little inquiry in any line. Such material as has been moving has been in small tonnages, and principally in heavy melting steel, borings and turnings, with some negotiations reported in old steel and iron axles. Dealers are inclined

to hold off on selling at present prices. We quote dealers' current selling prices as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$10.25 to $10.50
Low phosphorus steel	14.00 to 14.50
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.50 to 13.00
Old iron axles	19.00 to 20.00
Old carwheels	10.50 to 11.00
Railroad malleable	9.75 to 10.00
Machine shop turnings	5.25 to 5.75
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	13.00 to 13.75
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	9.00 to 9.75
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

Cincinnati

CINCINNATI, OHIO, July 15, 1914— (*By Wire.*)

Pig Iron.—The midsummer dulllness incident to the usual shutdown for taking inventories has given the market an appearance of inactivity. A large number of requests are coming in to hold up shipments of Southern iron until after the reduction in freight rates goes into effect. It is generally believed that when this reduction is made it will broaden the field for Southern producers to a considerable extent, but the published announcement of the proposed change has as yet not affected the market. Inquiries for foundry iron are scarce and not enough business is transacted to arouse any interest in either Southern or Northern quotations. An inquiry is out from Kokomo, Ind., for 12,000 to 15,000 tons of basic iron, for shipment this year. It is reported that this will be bought this week. Several small requests have been received for prices on Ohio silvery irons, but there appears to be no basis for the rumor that any has been offered below $16 at furnace, based on an 8 per cent. analysis. The melt of foundry iron in this territory is at a low ebb, and leaving out the stove foundries it will hardly average 40 per cent. of normal. The resumption of operations by one large rolling mill and the proposed starting up of another nearby plant within the next 10 days will increase the consumption of basic iron. Curtailment in production in the Hanging Rock district still continues and by the end of the week only one stack will be in operation there. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$13.75 to $14.25
Southern coke, No. 2 f'dry and 2 soft	13.25 to 13.75
Southern coke, No. 3 foundry	12.75 to 13.25
Southern No. 4 foundry	12.25 to 12.75
Southern gray forge	11.75 to 12.25
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.45 to 15.95
Southern Ohio coke, No. 2	14.45 to 14.95
Southern Ohio coke, No. 3	14.20 to 14.45
Southern Ohio malleable Bessemer	14.45 to 14.95
Basic, Northern	14.45 to 14.95
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(*By Mail*)

Coke.—The past week was very dull. Few foundries bought any coke, as most of them have taken care of their nearby requirements. No contracting in furnace coke is reported, nor are there any inquiries. As practically all of the furnaces in southern Ohio are out of blast, little business is to be expected from this source in the near future. On the other hand, the demand for domestic coke is holding up fairly well, although the tonnage ordered is comparatively light for this time of the year. Connellsville quotations for prompt shipment 48-hr. coke range from $1.75 to $1.90 per net ton at oven for delivery through the remainder of the year. A few favorite brands are held at higher figures. Foundry coke ranges from $2.25 to $2.60 at oven in all three districts. On furnace coke an advance of 10c. to 20c. a ton is asked for Pocahontas and Wise County brands over the Connellsville quotations.

Finished Material.—A considerable increase is noted in the number of orders for both black and galvanized sheets; while the mills are not willing to make any long time contracts, considerable future shipment business is in sight that is somewhat encouraging. The jobbers are now disposed to take hold, and are quietly negotiating on future requirements. Specifications on old contracts are also coming in at a more satisfactory rate. Prices are firmer around 1.95c. for No. 28 black sheets and 2.90c. for galvanized, f.o.b. Cincinnati and Newport, Ky. Steel bars and structural shapes are not in very good demand, but there is a slight improvement reported over the previous week's record. Store prices on steel bars and structural material remain around 1.75c. to 1.80c. Hoops and bands are very quiet.

Old Material.—The only improvement to be noted is a little better demand for several grades of scrap iron from outside territory. The foundries in this vicinity are consuming a minimum quantity, and as the rolling mills are well stocked there does not seem to be any reason to hope for an early improvement in the nearby demand. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$6.75 to $7.25
Old iron rails	11.75 to 12.25
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	10.75 to 11.25
Melting steel rails	9.25 to 9.75
Old carwheels	10.25 to 10.75

Per Net Ton

No. 1 railroad wrought	$8.75 to $9.25
Cast borings	4.50 to 5.00
Steel turnings	4.50 to 5.25
Railroad cast scrap	9.25 to 9.75
No. 1 machinery cast scrap	10.25 to 11.25
Burnt scrap	6.00 to 6.75
Old iron axles	15.50 to 16.00
Locomotive tires (smooth inside)	9.75 to 10.25
Pipes and flues	6.25 to 6.75
Malleable and steel scrap	7.25 to 7.75
Railroad tank and steel scrap	5.25 to 5.75

Birmingham

BIRMINGHAM, ALA., July 13, 1914.

Pig Iron.—Some buoyancy has been imparted to the market by the decision of the Interstate Commerce Commission reducing freight rates to the North. It is generally accepted that Chicago and other Northern producing centers will become equally busy and some of the advantage secured by the Southern furnaces may be offset, but the Southern producers as a rule hold that the decision is potent in that it declares the principle that freight rates should not be based upon the cost of production. The decision was especially consoling as it came immediately upon the heels of the re-entry of several Southern iron makers into St. Louis, Cincinnati and Chicago territory, from which they had been barred for some time. However, the market gathered no immediate strength and it is still a struggle to maintain the level of $10.25 for spot and even last half shipment as a rule, while, on the other hand, one interest, perhaps two, will not sell for the fourth quarter under $10.50. Transactions during the past week were not very heavy, a total of 18,000 to 20,000 tons being the probable take. One interest sold 7000 tons and another 2000 tons. The leading interest appears still to be a small seller. The consumer continues hammering for $10, but, from all that can be gathered, this accommodation will not be granted except in occasional instances. In other words, while some sales may be made at $10, that quotation will not be made, and cash or quick credit is necessary to secure the consideration. Production fell off in June and will not be increased soon, the furnaces to go in replacing others going out. However, there are a number of stacks ready for the torch, which may go in on short notice of betterment in conditions. We quote, per gross ton, f.o.b. Birmingham district furnaces, for third and fourth quarters as follows:

No. 1 foundry and soft	$10.75 to $11.00
No. 2 foundry and soft	10.25 to 10.50
No. 3 foundry	9.75 to 10.00
No. 4 foundry	9.50 to 9.75
Gray forge	9.25 to 9.50
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—The water pipe concerns are operating on the same basis, about 65 per cent., and still suffer from a lack of large orders, those coming in being mostly for renewals and immediate wants with very little for new construction. Sanitary pipe shops enjoy a fair business, with a good demand from Western points. We quote, per net ton, f.o.b. makers' yards, as follows: 4-in., $20.50; 6-in. and upward, $18.50, with $1 added for gas pipe.

Coal and Coke.—Alabama coal operators are bent upon trade extension. The Pratt Consolidated, the largest independent coal operator in the South, will enter the business of barging coal down the Warrior River to Mobile. Besides opening mines, the company will operate towboats and barges. The Alabama Company secured a 25,000-ton contract from the Southern Cotton Oil Company. Operations are gradually expanding, but prices are still low. Coke is quiet, with prices apparently firm. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, $2.75 to $2.90; foundry, $3 to $3.25.

Old Material.—The market is extremely dull, transactions being almost nominal. Prices are not well maintained. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.50 to 15.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	8.50 to 9.00
No. 1 country wrought	9.00 to 10.00
No. 2 country wrought	8.00 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	9.50 to 10.00
Standard carwheels	10.50 to 11.00
Stove plate	8.00 to 8.50

San Francisco

SAN FRANCISCO, CAL., July 8, 1914.

Business in all departments is getting down to the customary midsummer dullness. The close of the fiscal year, with the succeeding holiday, has not been conducive to buying, and no particular expansion in general consuming requirements is expected for the next 60 days. Contracting for extended delivery has been on an unusually limited scale. The only stir in the market is caused by the continued receipt of scattered but not numerous inquiries for special projects, some of which involve considerable tonnage.

Bars.—Reinforcing bars are in fair demand, with inquiries included for a number of small country bridges. A local mill has taken a good-sized contract for harbor work, and one of the largest jobs in prospect is the Twin Peaks tunnel. Prices for ordinary orders are too irregular for any definite quotation. Local mills have an advantage when prompt delivery is required, but the offering of foreign material tends to depress prices. Merchants are amply supplied with soft steel bars, which are now moving but slowly, and are buying practically nothing from either importers or domestic mills. Eastern bars are quoted at 1.65c., for water shipment. German bars are even easier than before, as the anticipated stiffening of prices at the mills has not taken place, and low transportation rates are offered by tramp steamers. There is some variation in quotations on foreign bars, according to amount and other considerations, the range being about 1.30c. to 1.35c., for either merchant or reinforcing bars, steamer shipment.

Structural Material.—Building records for the last month show some curtailment, and few contracts have been booked locally, though the Pacific district as a whole shows a fair tonnage. The largest local contract was taken by the Central Iron Works, a 15-story building coming to over 700 tons, but otherwise there is nothing of much importance. Dyer Brothers have taken a small bridge at Chico, Cal., and the Eureka Boiler Works, Eureka, Cal., has a hotel at Arcata, Cal., and a bridge over Klamath River. Figures have been taken for the Alhambra Theater, Ogden, Utah. American shapes, for water shipment, are quoted at about 1.70c., and foreign at about 1.56c.

Rails.—Competition in the very light sections, such as 8-lb. rails, is close, German material being quoted at 1.40c., c.i.f., duty paid, while some domestic mills are endeavoring to meet this figure. The demand is limited, but in slightly heavier material a very fair business has been done. Several good-sized inquiries have also appeared for standard sections, but there is no certainty that business will result.

Plates.—Recent bookings have not been heavy, but the Shell oil interest is taking figures on tank work which will require a large tonnage, and there is considerable miscellaneous tank work under way. The Portland Gas & Coke Company, Portland, Ore., has let a contract for a $30,000 gas holder to the Camden Iron Works, Camden, N. J. Jobbing business is dull, and neither merchants nor manufacturers are contracting far in advance of requirements. German plates, ¼-in. and over, have lately been offered at about 1.50c., duty paid, for round lots; while American material, via Panama, costs about 1.70c. Local manufacturers have so far felt justified in favoring domestic mills, notwithstanding this difference in price.

Sheets.—Prices are still stiffening in response to Eastern conditions, and the increasing firmness is bringing out a good many small orders, though there is nothing resembling an active movement. Stocks are light, and conditions are favorable for a large business should the upward tendency continue. The consuming demand, however, is comparatively light. No. 28 black sheets are quoted on the basis of 1.80c. to 1.85c., Pittsburgh; galvanized at 2.75c. to 2.80c., and No. 10 blue annealed at 1.35c. to 1.40c.

Standard Pipe.—The jobbing movement continues rather quiet, both locally and in the country, and most buying by merchants is of a sorting-up nature. Oil-field business is not especially active, though the recent court decision regarding the Southern Pacific oil land holdings is expected to bring some betterment.

Cast-Iron Pipe.—The outlook for municipal business is slightly better, and a fair tonnage has been placed recently, including contracts from Los Angeles, Long Beach, San Diego and Santa Ana, which aggregate 3000 tons. Little buying by gas companies is expected for the remainder of the year. Local prices are quoted at $32 per net ton for 6-in. and over; $34 for 4-in.; $1 extra for gas pipe.

Pig Iron.—The local trade is sluggish, both for spot and future delivery. Stocks held by the larger foundries are gradually decreasing, but it has been impossible to effect any material reduction in the tonnage held by importers, and the foundries are reluctant to contract for fall delivery. Quotations on Middlesbrough iron, for shipment on sailing vessel, remain at $19.50 to $20.

Coke.—Supplies on hand are more than ample for current needs; and it is difficult to close contracts for future delivery. German Syndicate coke for delivery from local yards is quoted at $13 per net ton, and for fall delivery at $10 per gross ton.

Old Material.—It is difficult to get any reliable index to prices, as there is practically no business in steel melting or wrought scrap. Dealers appear to be in control of the local supply of steel scrap, and are asking $10 to $11 per gross ton, though purchases are reported at Seattle at $5 to $6, and there is quite a large tonnage in the local yards. Buyers are refusing to pay the price asked here. The situation in wrought scrap is similar, with no business. Cast-iron scrap is moving in a small way, being quoted at about $15, delivered at foundries.

Boston

BOSTON, MASS., July 14, 1914.

Old Material.—The dealers have little to tell regarding the situation. While general sentiment is better, sales are slightly less active, because of the conditions which attend the summer season. Prices are unchanged. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for

freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.25 to $8.50
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.25 to 13.75
Old iron axles	21.25 to 21.75
Mixed shafting	12.00 to 12.25
No. 1 wrought and soft steel	9.00 to 9.25
Skeleton (bundled)	5.50 to 5.75
Wrought-iron pipe	7.50 to 7.75
Cotton ties (bundled)	6.00 to 6.25
No. 2 light	3.75 to 4.25
Wrought turnings	5.00 to 5.50
Cast borings	5.25 to 5.75
Machinery, cast	11.25 to 11.50
Malleable	8.00 to 8.25
Stove plate	7.75 to 8.00
Grate bars	5.25 to 5.50
Cast-iron carwheels	11.00 to 11.25

St. Louis

ST. LOUIS, Mo., July 13, 1914.

Pig Iron.—A better feeling prevails but the Southern product is being affected by the recent rate decision which means a saving of 35c. per ton to this market. Melters are disposed to hold up shipments to take advantage of the freight change, effective, it is expected, about August 15. Included in the transactions of the week was one of 10,000 tons of Northern basic bought by a large local steel foundry and it is understood that the price was better than $14.50 delivered at Granite City, Ill. Another sale reported was of 300 tons of Southern for last half delivery. Inquiries pending are for 500 tons of No. 2 Northern foundry, 500 tons of Northern carwheel iron and several for smaller lots. The prices quoted are slightly weaker than at last report and there have been some sales of No. 2 Southern made on a $10 Birmingham basis, but scarcely enough as yet to establish that as the market at this point.

Coke.—There are no contracts closed or pending of any particular moment. Best 72-hr. selected Connellsville is quoted, at oven, at $2.30 per net ton for prompt shipment and $2.40 on contract, this latter figure about meeting the by-product St. Louis delivery price of $5.20. Some sales have been made at slightly better than market prices in small lots for quick delivery.

Finished Iron and Steel.—The leading interest reports business as 70 to 75 per cent. of normal for this territory, with a decidedly better feeling among the consumers.

Old Material.—There is a better feeling but scrap dealers do not anticipate any tangible developments before the first of the coming month, when plants now shut down for repairs, etc., will resume. It is understood, however, that orders are piling up somewhat which will result in the taking of material in better shape than has been the case in recent months. Lists out this week include 200 tons from the Vandalia, 800 tons from a local industry and 5200 tons from the Southern Railway. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails	$11.00 to $11.25
Old steel rails rerolling	11.25 to 11.50
Old steel rails, less than 3 ft.	10.50 to 10.75
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	11.00 to 11.25
No. 1 railroad heavy melting steel scrap	10.50 to 10.75
Shoveling steel	8.00 to 8.50
Frogs, switches and guards cut apart	10.50 to 10.75
Bundled sheet scrap	5.00 to 5.25
Per Net Ton	
Iron angle bars	$10.00 to $10.50
Steel angle bars	9.25 to 9.50
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.25
Wrought arch bars and transoms	11.00 to 11.50
No. 1 railroad wrought	8.00 to 8.25
No. 2 railroad wrought	8.00 to 8.25
Railroad springs	9.25 to 9.50
Steel couplers and knuckles	9.25 to 9.50
Locomotive tires, 42 in. and over, smooth	8.75 to 9.25
No. 1 dealers' forge	7.75 to 8.00
Mixed borings	4.00 to 4.25
No. 1 busheling	7.25 to 7.50
No. 1 boilers, cut to sheets and rings	5.75 to 6.25
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.25 to 8.75
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.50 to 8.00
Pipes and flues	5.75 to 6.25
Railroad sheet and tank scrap	5.75 to 6.00
Railroad grate bars	7.25 to 7.50
Machine shop turnings	5.00 to 5.25

New York

NEW YORK, July 15, 1914.

Pig Iron.—Apart from the 10,000 tons of foundry iron sold to a large electric interest, as already mentioned, the chief recent transaction involved 6000 to 8000 tons for Eastern malleable plants, for which the buying is through a single office. Some further sales of pipe iron are reported, part of the business going to the South and the remainder to eastern Pennsylvania. The tonnage is put at about 7000. A Brooklyn foundry bought about 750 tons in the past week. Other local business has been in 100-ton to 400-ton lots. A late inquiry from New England is for 2500 tons of special iron. The Virginia pig iron rate reduction, which is of unknown amount as applied to a number of eastern Pennsylvania points, and which may cut some figure in certain interior New England cities, is not consequential in the New York district. The reduction in the all-rail rate from Virginia furnaces to New York City, which is from $3.95 to $3 sounds large, but shipments to this district from Virginia would naturally be by rail and water route. The Old Dominion combination rate has been $2.80 to the New York pier of that line, but on considerable lots special charters have usually been made under which deliveries at designated docks convenient to consumers have been made at $2.65 to $2.70. Buffalo sellers, after a lapse from the $13 furnace basis for No. 2 X, in early July competition, some sales in the East having been made at $12.50, are now more generally holding to $13. The situation is one in which concessions are readily called out by any considerable business. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.75 to $15; No. 2 X, $14.45 to $14.70; No. 2 plain, $14.25 to $14.50. Southern iron is quoted at $14.75 to $15 for No. 1 and $14.25 to $14.50 for No. 2.

Cast-Iron Pipe.—While no public lettings of importance are in sight in this immediate district, private inquiry keeps up well. The Boston contract for 700 tons of 60-in. was secured by a Philadelphia manufacturer. The price was low for the size, but not so low per ton as made on other recent public lettings. The United States Cast-Iron Pipe & Foundry Company was low bidder for supplying pipe and special castings to the Water Bureau, Buffalo, for one year from July 1 at $21.40 per net ton for all sizes of pipe, and the following prices for special castings: 4 to 30-in., $50 per ton; 36 to 60-in., $90 per ton. Carload lots of 6-in. are still available at $20.50 to $21 per net ton, tidewater.

Old Material.—The market continues extremely quiet. A large eastern Pennsylvania steel company has again put out inquiries for some tonnage of heavy melting steel scrap, offering $10, delivered. The same consumer put out similar inquiries a couple of weeks ago, naming the same price, but it is understood was not able to find a dealer willing to accept. No improvement is seen in the movement to steel companies, but they are still requesting shipments deferred on old contracts. Rolling-mill stock is especially depressed because of the diminished consumption by rolling mills. The F. A. Godcharles Company, Milton, Pa., manufacturer of cut nails, has called a meeting of its creditors July 16 at the Bellevue-Stratford, Philadelphia. The following are dealers' quotations, per gross ton, New York, which are largely nominal in the absence of business:

Old girder and T rails for melting	$7.75 to $8.25
Heavy melting steel scrap	7.75 to 8.25
Relaying rails	21.00 to 21.50
Rerolling rails (nominal)	10.00 to 10.50
Iron car axles	17.00 to 17.50
Steel car axles	11.50 to 12.00
No. 1 railroad wrought	10.00 to 10.50
Wrought iron track scrap	8.75 to 9.25
No. 1 yard wrought, long	8.25 to 8.75
No. 1 yard wrought, short	7.75 to 8.25
Light iron (nominal)	3.25 to 3.50
Cast borings	5.50 to 5.75
Wrought turnings	5.25 to 5.50
Wrought pipe	7.00 to 7.50
Carwheels	9.25 to 9.75
No. 1 heavy cast broken up	10.00 to 10.50
Stove plate	7.50 to 8.00
Locomotive grate bars	6.00 to 6.25
Malleable cast	7.25 to 7.75

Ferroalloys.—An absence of transactions of any size, with scarcely any small lot sales or inquiries, char-

acterizes the market. The inquiry for about 300 tons of 80 per cent. ferromanganese, spoken of two weeks ago, is reported to be still pending, while quotations for the English product remain at $38, seaboard, with the German selling at $37, seaboard. Fifty per cent. ferrosilicon is still quoted at $71 to $73, Pittsburgh, according to quantity.

Finished Iron and Steel.—July has been disappointing thus far not only in point of the volume of business but in indications of weakness in price. For example, bars, plates and shapes are obtainable in carload lots at 1.10c., Pittsburgh, though for immediate business only, and with some Eastern plate mills, the ruling minimum quotation has been shaded 50c. and $1 a ton for carload lots. This is not to say that considerable of the going business in small lots is not yet at 1.15c., Pittsburgh, as the minimum. New inquiry in structural lines is very light and awards are few. In railroad cars, purchases are mainly confined to roads which are in a position always to buy promptly in a low market. Bids for structural material for further local transportation work will be received this and next week, in one case for 5000 tons, mainly for third tracking of Brooklyn elevated lines, and in the other for a round tonnage for subways in Manhattan. Another Paterno apartment is up for figures, Eighty-fourth street and Broadway, involving about 1100 tons, and others of the same ownership are projected; the general contract has been placed for a 12-story building at Thirty-fifth street and Broadway, taking 1000 tons, and a Y. M. C. A. building, 750 tons, is to be built at Rochester, N. Y. The Y. M. C. A. building in Brooklyn is expected to go to the Hay Foundry & Iron Works; a department store, Springfield, Mass., 600 tons, is reported placed with the Berlin Construction Company, and the Eastern Steel Company has 150 tons for the Fisher residence, East Seventy-ninth street. In railroad cars the Delaware, Lackawanna & Western, in addition to 55 passenger equipment cars and 500 gondolas, is also in the market for 500 coal cars. The Chicago & Illinois Midland has bought 250 gondolas from the American Car & Foundry Company. We quote mill shipments of steel bars, shapes and plates at 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, with the lower price in the case of bars, particularly, for desirable lots at mills' convenience. We quote iron bars at 1.20c. to 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plates and structural material at 1.85c. to 1.90c.

Better British Sentiment

Although No Improvement is Reported in Buying, the Feeling Is a Shade Better

(*By Cable*)

LONDON, ENGLAND, July 15, 1914.

The feeling is a shade better, helped by more cheerful American advices as to the steel trade, but no improvement is yet seen in buying. Alabama foundry pig iron is being offered for Italian delivery at about 58s. 6d. ($14.24) c.i.f. No change has occurred this week in either semi-finished or finished steel. A good order for tin plates for the East has been placed in Wales at 12s. 3d. ($2.98) for quarters. Stocks of pig iron in Connal's stores are 80,373 gross tons, against 80,639 tons a week ago. The number of blast furnaces in operation in Scotland, Cleveland and Cumberland is 165, against 204 for the corresponding time last year. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 11s. 10½d. ($2.89).

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 51s. 4½d. ($12.50), against 51s. 3d. ($12.47) a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. 9d. ($12.59).

Hematite pig iron, f.o.b. Tees, 59s. ($14.35).

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. ($21.89).

Steel bars, export, f.o.b. Clyde, £5 15s. ($27.98).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 10s. ($26.76).

Steel ship plates, Scotch, delivered local yards, £5 12s. 6d. ($27.37).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 7s. 6d. ($40.75), against £8 15s. ($42.58) a week ago.

Steel rails, export, f.o.b. works port, £5 12s. 6d. ($27.37).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, nominal.

German 2-in. billets, f.o.b. Antwerp, nominal.

German basic steel bars, f.o.b. Antwerp, 80s. to 81s. ($19.46 to $19.70), for both prompt and forward, a reduction of 49c. to 98c.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. ($24.82 to $25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft. 9s. to 10s. ($2.19 to $2.43). Iron and steel sheets, 11s. to 12s. 6d. ($2.68 to $3.04). Beams up to 30 ft., 12s. 6d. ($3.04).

German Outlook Unimproved

Slow Progress in New Combinations — Prices Still Weak—Foreign Trade Poor

BERLIN, July 3, 1914.

A pessimistic tone still marks trade reports, and there seems to be no expectation of an early change for the better, unless the organizations in finished steel should be perfected. The provisional agreement of the tubing manufacturers raised strong hopes for the formation of organizations in the other B products; but since a week ago no material progress has been made in any of these. The tube manufacturers agreed on an immediate advance of prices, and all sales now occurring are to be transferred to the account of the new organization later, if it be made permanent. The works are selling for the present only when orders are accompanied with specifications. While the prospects for the completion of the organization are regarded as very good, two inconclusive meetings have been held the past week and a further meeting is to be held next week. [A cablegram from Berlin under date of July 10 states that at the meeting of tube makers held that day the Upper Silesian manufacturers insisted that nothing should be done in this direction unless the other finished steel products were likewise syndicated. The negotiations were adjourned until September 15, and in the meantime the doors have been opened to renewed rate cutting, which is thought likely to depress the already unsatisfactory iron and steel market.—EDITOR.]

Belgium is again sending in lower prices and the German rivet makers are complaining that Thyssen is offering rivets at his Hagendingen establishment at 8 to 10 marks ($1.90 to $2.38) a ton below the association schedule. The association will meet about the middle of the month to make an effort to induce him to hold to the convention price. Belgian works are now selling ordinary commercial bars at £4 ($19.46), and are even taking at the same price orders for qualities that would command 1 to 2s. (24c. to 49c.) more. German mills are selling at 82 to 84s. ($19.95 to $20.43), on ship at Antwerp. Belgian iron bars are going at £4 17s. ($23.60), on board ship; but incoming orders are extremely light. Belgian heavy plates are selling at £4 13s. ($22 62); the cheapest German price mentioned is that of the Dillingen branch of the Deutsch-Luxemburg Company, which is selling at £4 16s. ($23.35), on ship. All forms of Belgian crude steel have just been reduced from one to two shillings a ton for export. The export price of 4-in. blooms is now 69 to 70s. ($16.79 to $17); 3-in. billets, 70 to 71s. ($17 to $17.24); 2-in. billets, 71 to 72s. ($17.24 to $17.49), and slabs, 74 to 75s., ($18 to $18.25) all f.o.b. Antwerp.

This week's news about the export trade is not favorable. The reports agree that business is quiet,

and there appears to be no prospect for an improvement. India and the far East have sent in no orders, except a few small ones for plates, which quickly found takers at low prices. Business with India is described as being especially bad. The Russian trade, on the other hand, continues prosperous, and German manufacturers are able to sell some goods there, notwithstanding the high Russian duties. The law for exempting a certain quantity of pig iron from a large part of the duty has at last become operative; and it is expected that German furnaces, particularly those of Silesia, will now be able to make considerable shipments to Russia. Business with South American countries continues in bad shape, and the business situation there does not warrant the hope that better trade will be seen at an early date. Buying by Brazil, Argentina and Chile has hardly occurred at all for some weeks.

The Steel Works Union, which held its usual monthly meeting yesterday, gave out a rather colorless survey of the market. It says that the home trade in semi-finished steel remains quiet, and that calls for shipment have for several weeks been of somewhat lighter volume, owing to stock taking. The Imperial Railways (those of Alsace-Lorraine) have given further orders for rails, ties and supplies. Better orders have come in from some foreign countries, although the foreign market in general remains quiet. Orders for the September quarter in rails for mines have kept up to the previous volume, although sharp competition continues to be felt in foreign markets. There is no considerable change in the home trade in structural shapes; specifications continue to come in only of sufficient volume to cover immediate requirements.

It is reported that the Westfaelische Eisen und Drahtwerke at Langendreer will pass its dividend this year. The descent of its dividend from 29 to 10, then to 8, then 3, and finally to nothing, is a striking illustration of the prostration of the wire industry.

Germany's production of steel in May amounted to 1,588,900 metric tons, comparing with 1,487,600 tons in April. The production for five months was 7,809,924 tons.

Metal Market

NEW YORK, July 15, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
July	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
8	14.00	13.75	31.95	3.90	3.75	5.00	4.85
9	14.00	13.75	32.55	3.90	3.75	5.00	4.85
10	14.00	13.62½	32.35	3.90	3.75	5.00	4.85
11	13.87½	13.62½	.....	3.90	3.75	5.00	4.85
13	13.87½	13.62½	32.25	3.90	3.75	5.00	4.85
14	13.87½	13.62½	31.50	3.90	3.75	5.00	4.85

Buying of copper has stopped and prices are lower. In tin there has not been much activity and quotations are lower. Lead has held up, with plenty to be had at prevailing quotations. The price of spelter has been maintained despite excessive stocks. Antimony is without change.

New York

Copper.—Since the appearance of the June statement of the Copper Producers' Association, showing an increase in stocks of 21,768,022 lb., there has been practically no demand from either domestic or foreign buyers. The statement was considered extremely unfavorable and not only killed buying, but brought the market down to 13.75c., full terms, or 13.62½c., cash, New York. The producers have not publicly announced this reduction and apparently believe that in view of the slight interest there is no reason for them to reduce their peg price, but the metal can be had easily enough at this figure and it might possibly be shaded a little. The quotation for Lake, 13.87½c., cash, is entirely nominal as the market is quiet, as it has been for the past two months. That the mills consuming copper are not running full is disclosed by efforts to interest them in raw material. The quotations in London to-day are £61 2s. 6d. for spot and £61 12s. 6d. for futures. Exports this month have been at a rather good rate and total 14,731 tons.

Tin.—In this metal there has been a good deal of action, but no heavy buying, the best day having been July 8, when probably 200 tons were traded in and more could have been sold had sellers been willing. They were inclined to wait for higher prices and these came about the following day when London went up, but conditions then reversed and sellers would not take hold while dealers showed considerable eagerness to sell. From that time on the market has been slow. On June 14 London declined £3, which was attributed to the report of the Interstate Commerce Commission on the affairs of the New Haven Railroad, a fact which indicates how sensitive the tin market is. A strong feature at the present time is that the available supply will be small this month and there is a possibility of a squeeze, or at least a scarcity, at the end of July or in the early part of August. The buying of last week already referred to was mostly by dealers. Stocks on July 1 consisted of 1358 tons, while the arrivals to July 14 were 1794 tons and there is due to arrive on other steamers this month 1180 tons, which would make the available July supply 4332 tons. It is estimated that July deliveries will be at least 3500 tons which will leave in stock July 31 only about 832 tons. The New York quotation yesterday was 31.50c. and those in London were £142 15s. for spot and £144 5s. for futures. The total of tin now afloat, though not all of it will be available for July delivery, is 2465 tons.

Lead.—Reports of the state of trade are somewhat contradictory, it being said by some that the demand is better. In quotations there has been no change with the New York price still at 3.90c. and St. Louis at 3.75c. and plenty of metal is available at these quotations. There is an optimistic feeling, however, as to the prospects for fall business.

Spelter.—The New York quotation is unchanged at 5c., sales having been made to-day at that figure, while St. Louis is 4.85c. to 4.87½c. The market is dull and adversely affected by the large stocks in producers' hands.

Antimony.—The market continues without noteworthy features, quotations continuing at about 7c. for Cookson's, 6.75c. for Hallett's and 5.40c. to 6c. for other grades.

Old Metals.—The market is inactive. Dealers' selling prices are nominally unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	13.00 to 13.25
Copper, heavy and wire	12.50 to 12.75
Copper, light and bottoms	11.50 to 11.75
Brass, heavy	8.50 to 8.75
Brass, light	7.00 to 7.25
Heavy machine composition	11.50 to 12.00
Clean brass turnings	8.50 to 8.75
Composition turnings	9.75 to 10.25
Lead, heavy	3.70
Lead, tea	3.40
Zinc scrap	3.85

Chicago

JUNE 13.—Trading in the non-ferrous metals has been listless and very limited in volume. Copper and tin quotations are being maintained with an appearance of strength, but concessions from the lead quotations of the leading interest are reported, and the weakness in spelter is not fully measured by our quotations below: Casting copper, 14.87½c.; Lake copper, 14.12½c. for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 32.75c.; small lots, 35.75c.; lead, desilverized, 3.85c., and corroding, 4.10c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.95c.; Cookson's antimony, 9.50c. for cask lots; other grades, 8c.; sheet zinc, $7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11.25c.; copper bottoms, 10c.; copper clips, 10.50c.; red brass, 10.50c.; yellow brass, 7.25c.; lead pipe, 3.30c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 26c.; block tin pipe, 27c.

St. Louis

JULY 13.—The metal markets have been rather slow the past week, with a drag down in prices, the close today being as follows: Lead, 3.75c.; spelter, 4.85c.; tin, 32.60c. to 32.80c.; Lake copper, 14.35c.; electrolytic copper, 14.10c. to 14.22½c.; Cookson's antimony, 7.47½c. to 7.60c. In the Joplin ore market there was a somewhat discouraged feeling as a result of the slump in metals and the basis range for zinc blende was $37 to $39 per ton for 60 per cent., with choicest lots ranging up to $42. Calamine was quiet at $19 to $21, with top settlements ranging up to $26. Lead ore was dull at $46 for 80 per cent. Miscellaneous scrap metals are quoted as follows: Light brass, 5.50c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; zinc, 3c.; lead, 3.25c.; pewter, 21c.; tinfoil, 25c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, July 15, 1914.

Transactions in stocks are still in small volume, not a single sale being reported in some on the list. Prices were well sustained, however, until Monday when a combination of unfavorable developments caused a sharp downward movement, from which there was some recovery on Tuesday. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com..	10 - 10¼	Nat. Enam. & St., com.	10¼ - 11
Am. Can, com...	26½ - 28⅝	Pressed Stl., com.	42½ - 43¾
Am. Can, pref...	90 - 92	Pressed Stl., pref.	102¾ - 103
Am. Car & Fdy., com.	50½ - 52⅜	Ry. Spring, com.	27¾
Am. Car & Fdy., pref.	118 - 118½	Republic, com...	21¾ - 23
Am. Loco., com..	29½ - 31½	Republic, pref...	85½ - 86
Am. Loco., pref..	99⅜ - 99½	Rumely Co., com.	10⅛
Am. Steel Fdries.	31	Rumely Co., pref.	28½
Bald. Loco., com.	48½	U. S. Steel, com.	59⅞ - 62⅝
Bald. Loco., pref.	106⅞ - 107	U. S. Steel, pref.	109⅜ - 109⅞
Beth. Steel, com..	40 - 42½	West'g'hse Elec..	76½ - 79⅝
Beth. Steel, pref.	84¾ - 85⅜	Am. Ship, com.	33
Colorado Fuel....	25 - 25½	Chic. Pneu. Tool.	53½ - 54½
Deere & Co., pref.	93½ - 94	Cambria Steel...	47¾ - 48⅝
General Electric.	147⅞ - 149¾	Lake Sup. Corp..	15½ - 16¼
Gt. N. Ore Cert..	30¾ - 31⅝	Pa. Steel, pref.	64
Int. Harv., com..	105⅞ - 107¼	Warwick	9⅝ - 9¾
Int. Harv., Corp.	104	Cruc. Steel, com.	155⅝ - 157⅝
Int. Harv., Corp., Pref..	119	Cruc. Steel, pref.	92 - 93⅝
Lackawanna Steel.	32	Harb. Wk. Ref., pref...	99
		La Belle Iron, com.	29⅛

Dividend Declared

The Taylor-Wharton Iron & Steel Company, regular quarterly, 1¾ per cent. on the preferred stock, payable August 1.

The directors of the Barney & Smith Car Company, Dayton, Ohio, have formulated a plan for taking the affairs of the company out of the hands of receivers. The plan provides for the issue of debenture bonds not to exceed $2,000,000, of which $1,500,000 will be required to pay the balance due to creditors and to provide necessary working capital. The debentures will be for 15 years at 6 per cent. interest and a sinking fund will be provided for gradual retirement. Stockholders will be given the privilege for subscribing to the bonds in proportion to the shares of stock held by them and payments will be made in four monthly installments, due on the first days of October, November, December and January.

Corrigan, McKinney & Co., Cleveland, Ohio, have placed an order with the General Electric Company for two 7500-kw. and one 2500-kw. turbo-generators for the power plant to be erected in connection with their new steel plant and for a 6000-hp. motor with control for driving the continuous mill.

The Vilter Mfg. Company, Milwaukee, Wis., manufacturer of ice and refrigerating machinery, Corliss engines, etc., has moved its Chicago office, C. J. Heinzelman, district manager, from 802 to 731 Monadnock building.

The Wickwire Steel Company, Buffalo, N. Y., states that the report is premature that it intends to erect a large steel mill. This may be done some time in the future when business conditions are better.

OBITUARY

JOSEPH F. KILBY, vice-president of the Kilby Mfg. Company, Cleveland, Ohio, died July 12, aged 67 years. He had been ill for about a year and in April was taken to a hospital for an operation. Instead of being benefited, his condition became worse and he remained in the hospital until his death. He was born in Germany in 1847, was graduated from Heidelberg University and came to the United States in 1865, locating in Sandusky, Ohio, where he was one of the organizers of Barney & Kilby, machinists. In 1888 he went to Cleveland and organized the Kilby Mfg. Company, which took up the manufacture of sugar-making and other machinery and engaged in the foundry business. He was general manager of that company until five years ago when he retired. He was a member of the Union and Euclid clubs in Cleveland, the Engineers' Club of New York and the Pacific Union Club of San Francisco. He leaves two sons.

QUIMBY N. EVANS, senior partner of the firm of Evans, Almirall & Co., Dominick and Clarke streets, New York City, contractors for heating, ventilating and power equipment, died suddenly on the evening of July 6. He had been engaged in this business for a long time, having been in partnership with Frederick Tudor in Boston, under the style of F. Tudor & Co., in the seventies. In 1880 he formed the Q. N. Evans Company, doing business in Boston and New York, and in 1885 formed the Q. N. Evans Construction Company in New York. In 1892 Juan Almirall became associated with him and a couple of years later the copartnership of Evans, Almirall & Co. was formed, and it has been in existence ever since. For the past two years Mr. Evans had practically retired, having felt that he could leave the affairs of the firm in younger hands. The business will be continued as in the past. The deceased leaves two sons.

CHARLES SUMNER BARTON, Worcester, Mass., head of the Rice, Barton & Fales Machine & Iron Company, builder of paper machinery, died July 12, aged 56 years. He was born in Worcester, the son of George S. Barton, one of the founders and for years the sole owner of the business. After a course at the Lawrence Scientific School of Harvard University, the young man entered the works and learned the business, both in the manufacturing and office ends, and on the death of his father in 1891 succeeded to the management in which he was eminently successful. He leaves a widow, a son, George S. Barton, the secretary of the corporation, and two daughters.

WILLIAM B. POTTER, founder and manager of the St. Louis Sampling & Testing Works, died at his home in St. Louis July 14, after a week's illness, aged 68 years. He was born in Schenectady, N. Y. His father was the late Bishop Potter. He was graduated from Columbia University in 1866, was assistant in geology in that university from 1869 to 1871, assistant in the Geological Survey of Ohio and was on the board of the Missouri Geological Survey from 1889 to 1893. He served a term as president of the American Institute of Mining Engineers. He leaves a widow, two sons and two daughters.

RICHARD E. KIDDER, Worcester, Mass., manufacturer of wood-working machinery, special machinery, patterns and models, died July 9 after a short illness, aged 72 years. He had been a resident of Worcester for 40 years, and for 25 years had conducted a factory on Hermon street. He leaves a widow.

A course in salesmanship and selling, Wednesday noons, in the rooms of the Merchants' Association, Woolworth Building, New York, has been inaugurated by the Efficiency Society, 41 Park Row, New York. There will be seven lectures in all. The first, scheduled for July 15, will be given by Frank Jewel Raymond, and the second, July 22, by Walt S. Goodwin.

IRON PIPE CONDUIT

Movement to Standardize Tests, Use, Dimensions, Fittings and Method of Handling

An active movement is under way to standardize tests of rust prevention treatment of iron pipe conduit used for electrical wires and to establish standard specifications covering the use, dimensions, fittings and the way such conduit should be handled in installation. It is an outcome of the fact that different conduits have not resisted corrosion to the same degree in the same or different conditions of use and it looks to the classification of conduits in, say, three grades, marketable at different prices. It appears that practically all conduits are sold at the one price but there are different qualities, a condition which does not work to the advantage of the manufacturer.

Recently a meeting was held in Pittsburgh of what is called the general committee, with an attendance of no less than 125, and out of this was formed an investigating committee, which it is understood is to have a meeting in Pittsburgh, July 23. The movement is owing much to investigations over four years by Bassett Jones, who is associated with Henry C. Meyer, Jr., consulting mechanical engineer, New York City. While he has developed a specification which gives a conduit that so far has met the requirements, he has recognized the desirability of opening the field as widely as possible to all manufacturers of electrical conduits. This requires among other things a standard test quickly performed, and this constitutes one of the particular tasks of the investigating committee. Railroad and steel mill interests are among those represented on the committee and also the manufacturers, although the latter have no vote. A. R. Raymer, assistant chief engineer, Pittsburgh & Lake Erie, is chairman of the committee. The committee has power to call in the assistance of any organization likely to be interested and it is planned to ask for example, for a representative from the American Society for Testing Materials.

To Build Potter & Johnston and Gridley Machines in England

To be in a better position to satisfy an increasing number of European customers, the Potter & Johnston Machine Company, Pawtucket, R. I., and the Windsor Machine Company, Windsor, Vermont, recently decided to erect works at Tyseley, Birmingham, England, under the name of Potter, Johnston & Gridley, Ltd., for the manufacture of Potter & Johnston automatic chucking machines, automatic center turning machines, automatic milling machines, automatic cutting-off machines, universal shaping machines and shaving machines; also the Gridley four-spindle automatic bar machines and automatic multiple spindle drilling machines, all of the above machines being covered by British and foreign patents.

In addition to the manufacture of the machines mentioned, there will be a specially organized tool-making department for the rapid supply of tools required by European customers, which will avoid the delays caused in transport when shipped from the American shops. The new works are now in course of construction and will be ready for occupancy in the coming fall.

Secretary A. O. Backert of the American Foundrymen's Association has under way a campaign for a large increase in the membership. The Thousand Member Club is the form the movement has taken and the slogan is "One thousand members before the meeting in Chicago." Each member of the club is expected to secure one new member.

The Thomas Iron Company expects to blow out about August 1 the single furnace it now has in blast, located at Hokendauqua, Pa. The company's Richard iron mine at Wharton, N. J., is still in operation. At this mine a new vein of rich ore 22 ft. wide was recently found.

Lackawanna Steel Company's Earnings

The statement of its income account for the second quarter and first half of 1914, just made public by the Lackawanna Steel Company, is an important contribution to the already formidable array of facts showing the severity of the depression in the iron and steel trades. Following is the statement for the first half of the year, compared with the corresponding period of 1913:

	1914	1913	Decrease
Income from manufacturing and operating after deducting all expenses incident thereto, including ordinary repairs and maintenance of plants and interest on bonds and fixed charges of subsidiary companies..	$455,278.89	$3,125,952.31	$2,670,673.42
Proportion of earnings on investments in companies not controlled, and of other annual income	160,903.49	387,516.90	226,613.41
Total	616,182.38	3,513,469.21	2,897,286.83
Deduct interest on Lacka. Steel Co. bonds and debentures outstanding...	874,850.00	874,911.83	61.83
Balance	*258,667.62	2,638,557.38	2,897,225.00
Less charges and appropriations for the following purposes:			
Sinking funds on bonds and exhaustion of minerals	82,187.61	231,705,28	149,517.67
Depreciation and accruing renewals	442,824.79	651,656.57	208,831.78
Total deductions...	525,012.40	883,361.85	358,349.45
Profit for first six months	*783,680.02	1,755,195.53	2,538,875.55
Special profit on sale of capital assets of subsidiary companies	.....	267,200.90	267,200.90
Total profit for first six months	*$783,680.02	$2,022,396.43	$2,806,076.45

*Deficit.

The showing for the second quarter is somewhat better than that of the first quarter, the deficit in the second quarter having been $338,472.93, against a deficit of $445,207.09 in the first quarter.

Unfilled orders June 30 were 128,880 gross tons, against 436,675 tons at the beginning of the year.

The Proposed Wheeling Consolidation

The stockholders of the Wheeling Steel & Iron Company will vote July 17 on the recommendation of the board of directors to consolidate with the Wheeling Sheet & Tin Plate Company. If the project is ratified, the capital stock of the Wheeling Steel & Iron Company is to be increased from $5,000,000 to $7,500,000. Of the increase, $1,200,000 in stock, or 12,000 shares, will be used, share for share, in buying the properties of the Sheet & Tin Plate Company, and the remaining $1,300,000, or 13,000 shares, will be offered only to stockholders, in proportion to their holdings, at par. The amount thus raised will provide funds for improvements and betterments. It is understood that the Top Mill blast furnace will be dismantled and replaced by a thoroughly modern furnace. A new bar mill is also one of the improvements under consideration, and the works of the Sheet & Tin Plate Company may be doubled. As the stock of the Wheeling Steel & Iron Company is selling much above par, the stockholders of the Sheet & Tin Plate Company will receive a bonus of about 48 per cent. for their stock.

The Stark Rolling Mill Company, Canton, Ohio, denies that any extensions will be made to its plant the present year. Owing to unsatisfactory business conditions the proposed enlargement has been postponed It is stated that it is the intention when the extension is made to erect a complete new unit consisting of 6, 8 or 12 mills for the rolling of sheets.

Book Reviews

Fan Engineering. An engineer's handbook of tables, charts and data on the application of centrifugal fans and fan system apparatus, including engines and motors, air washers, hot blast heaters and systems of air distribution. Edited by Willis H. Carrier. Pages, 531; 4¼ x 6¾ in.; generously illustrated. Published by the Buffalo Forge Company, Buffalo, N. Y. Price, $3.

The secondary title of the book describes pretty well what it is, but the compiler of the book, who is chief engineer of the Buffalo Forge Company, and the long time identification of the company with the heating, ventilating, drying and allied industries, together with its earlier publications of engineering, as well as commercial value, speak for the reliability and practical utility of the present publication. It is difficult to mention the book in other than terms of unqualified approval. Its first part, devoted to properties of air, including a division given over to humidity, is undoubtedly the most complete treatment of the subject to be found in any handbook or text-book. Added to this is the important fact that the editor of the handbook has been himself engaged especially in this particular subject for some years, and has already made some altogether new contributions to the science.

The application of the use of fans is treated from the standpoint of heating, ventilation, air washing, cooling, drying, mechanical draft and exhaust systems. The treatment of heat losses is notable for its clear exposition of the underlying laws, as well as for the numerous coefficients which have been selected from apparently every available source. The portion devoted to air washing naturally has behind it the authoritative investigations of the Carrier Air Conditioning Company, and special mention should be made of the portion devoted to exhausting systems for collecting dust, shavings and other debris, an application of the fan that has ordinarily received very little attention in the literature of the general subject.

Part 3 is another distinctly valuable portion, and is devoted to air ducts. Among the subjects taken up are pressure losses in ducts and elbows, with a good deal of practical engineering information concerning the proportioning of piping for various kinds of systems, together with examples indicating the application. This part of the book is conspicuous also for its numerous useful tables. Twenty-two pages are given over to the design and selection of the fans, and this is followed by over 200 pages, devoted in part to the testing of fans and to an explanation of the underlying factors governing capacity, but mostly given up to tables. The last third of the book takes up the engineering and construction of heaters, air conditioning apparatus, steam engines, etc.

Finally the book is essentially for the engineer, who will find the subjects presented so he may grasp what he is after quickly. He will find wherever possible that matter is presented in tabulated form. A detailed index is, of course, provided.

Steam Pipes, Their Construction and Arrangement. Pages, 108, 5⅜ x 8⅜ in.; illustrations, 62. Published by Vulcan Boiler & General Insurance Company, Ltd., Manchester, England. Price 1s.

Much good work has been accomplished by the boiler insurance engineers in their investigations of explosions and failures in steam appliances, and this book, prepared by the engineers of the company, is based almost entirely on their actual experience and is published by them with the idea that it will be of value to those who are responsible for the installation and maintenance of steam piping. It has been written by practical men and is well worth reading by those for whom it was written.

The complete and automatic removal of all water, whether arising from condensation or being entrained in the steam, leads through a discussion of the drainage of piping, water hammer, separators and steam traps. Under the strength of pipes, cast iron, steel and copper are discussed, as well as joints and fittings. The fact that a steam pipe may expand one foot in 500 makes it necessary to go into details regarding hangers and suitable provision for taking care of expansion and contraction. The loss of heat by radiation and non-conducting coverings is also included in the work.

Telephone Construction, Installation, Wiring, Operation and Maintenance. By W. H. Radcliffe and H. C. Cushing. Second revised and enlarged edition. Pages viii + 223; 4¼ x 6½ in.; illustrations, 150. Published by the Norman W. Henley Publishing Company, 132 Nassau street, New York City. Price $1.

This is an up-to-date elementary treatise on telephone engineering, intended for the amateur, the wireman or the engineer. It is compiled expressly for the beginner and is written in a clear, easy style, free from all unnecessary technicalities. Details and diagrams are given that thoroughly cover each subject and enable the reader at a glance to get the gist of the discussion. It is a good book for the plant engineer who is installing or maintaining inter-communicating telephone systems in offices and factory departments. It should be a handy companion, especially for such purposes, not only on account of its convenient pocket size, but also on account of the index giving a ready reference to cover each kind of a job.

Poor's Manual of Public Utilities for 1914. Text pages, 2172, 5¾ x 8¾ in. Published by Poor's Railroad Manual Company, New York. Price $7.50.

This second annual number of this important manual contains 248 pages more of text than the first edition. The added matter consists of 400 new statements and 300 new comparative tables. In connection with bond issues the descriptions have been extended and in most cases it is stated whether or not interest is payable without deduction for the normal United States income tax. The re-arrangement of street railroads is a valuable feature. Instead of presenting statements in the old way by States those of street railroads in public utility systems appear in connection with the statements of the respective holding companies. This is the only manual devoted entirely to public service corporations, and it stands in the same relation to the public utilities as that which Poor's Manual of Railroads has occupied to the railroad field for so many years.

The Vulcan Process Company, Inc., Twenty-fifth and University avenues, Minneapolis, Minn., has brought out a new instruction book on the welding and cutting of materials by the oxy-acetylene process. Although all of the illustrations are of the company's apparatus or of work done by it, there are a large number of the chapters which give general information of the development of the process, the generation of the gases employed and the use of the oxy-acetylene flame and the auxiliary apparatus employed. The price of the book is $1.

The National Council for Industrial Safety will hold the third annual Safety Congress at the La Salle Hotel, Chicago, Ill., October 13 to 15, inclusive, 1914. It will undoubtedly be attended by a large number of safety experts and others from all parts of the United States. Manufacturers of safety devices who desire to have their appliances on view at the congress are invited to communicate with the manager of the La Salle Hotel, so that suitable reservations (at the expense of exhibitors themselves) may be arranged for in the vicinity of the National Council's own exhibit. The general offices of the National Council are at 208 South La Salle street, Chicago.

Some 12,517 men are now at work in the construction of subway systems in New York City, according to the last report of progress of Alfred Craven, chief engineer of the Public Service Commission. It appears that more than half the work is now under contract, but that when all contracts have been let, a matter perhaps of only a few months, the number of men will be almost doubled. The city has $126,414,000 in contracts, in progress or completed.

PIG-IRON SCHEDULE, 1914 CENSUS

Official Schedule for the Blast-Furnace Industry —Criticisms and Suggestions Asked

WASHINGTON, D. C., July 14, 1914.—The schedule upon which will be made the returns on blast furnaces for the manufacturing census of 1914 has been approved by the Director of the Census, through whose courtesy *The Iron Age* is enabled to present below the text thereof. This schedule is considered second only in importance to that covering steel works and rolling mills, which appeared in *The Iron Age* last week. In one particular the publication of this schedule is of even greater importance, for the reason that owing to the large number of blast furnaces under individual ownership it has not been found practicable to submit the schedule for the approval of so large a percentage of operators as was the case with the steel-works and rolling-mill schedule. The Director of the Census, therefore, will be glad to have blast-furnace owners and operators examine this schedule as here presented with special care and submit at the earliest practicable date any pertinent suggestions or criticisms. These schedules will be supplied to all producers or or before December 1 next and their final print will be delayed a few days after this publication to enable interested parties to notify the Census Office of any desired changes.

The blast-furnace schedule has been prepared with unusual care with a view to securing not only an accurate return of output but also of type, equipment, and capacity. These statistics will be carefully grouped in the general summary that will accompany the bureau's final report on blast furnaces and will give a faithful picture of the industry in every part of the country where blast furnaces are operated.

The text of the supplemental schedule covering blast furnaces is as follows:

Department of Commerce—Bureau of the Census

IRON AND STEEL—BLAST FURNACES, 1914

Supplemental Schedule

Name of establishment .....
Name of owner or lessee .....
Location of furnace plant { State ..... County .....
{ Post-office .....

(Establishments operating blast furnaces, steel works and rolling mills, tin-plate and terne-plate works, or wire mills as departments of one establishment, should make separate reports for each department in the General and respective supplemental schedules, reporting in the Supplemental Schedule for administrative and general offices the capital, employees, and expenses not assignable to any of the plants. Separate reports should also be made for iron mines, coal mines, and coke ovens operated by this establishment.)

1. Materials used: Give the quantity and cost of the principal materials used during the year as indicated. If the iron ore, coal, limestone, coke, etc., used are from mines and quarries or coke ovens operated by the establishment reporting, the cost should be based on the average price of these materials for the vicinity of the blast furnaces and the fact indicated under remarks.
The total cost of all materials should appear only in the General Schedule for Manufactures.

Kind	Quantity	Cost
Domestic iron ore, including manganese ore, manganiferous iron ore, zinc, residuum, etc., Gross tons		$
Foreign iron ore (from outside United States) including manganese ore, manganiferous iron ore, zinc, residuum, etc ..... Gross tons		$
Fluxing material, including limestone, dolomite, oyster shells, etc ..... Gross tons		$
Mill cinder, roll scale, scrap, slag, flue dust, etc., (not including scrap or flue dust produced by furnace reporting, regardless of whether dust is used raw, briquetted, sintered or nodulized) Gross tons		$
Fuel for smelting:		
Coke ..... Net tons		$
Anthracite coal ..... Gross tons		$
Bituminous coal ..... Net tons		$
Charcoal ..... Bushels		$

2. Accessory equipment.

Blast-furnace gas, if used for power by establishment reporting:
Gas engines using blast-furnace gas: Number .....
Horsepower of each .....; total horsepower .....
In what department used? .....
Rolling mills ..... Steel works ..... Blast furnace .....
Other departments (specify department) .....

Granulated slag pits:
Number of granulating pits .....; Serving ..... blast furnaces.
Aggregate capacity, in gross tons, of granulated slag .....

Pig-iron casting machines:
Number of pig-iron casting machines with blast furnaces .....
Type of machines (Uehling, Heyl & Patterson, etc.) .....

3. Products: Give the quantity and selling value or price at the furnace and account for all products and by-products of this department manufactured during the year (whether sold or not).
The total value of products in this schedule must agree with the total in the General Schedule.

Kind	For interplant and department consumption: Quantity, Gross tons	For interplant and department consumption: Assigned value	For sale outside of this establishment: Quantity, Gross tons	For sale outside of this establishment: Value	Total production, Value
Pig iron, including spiegeleisen, ferromanganese, ferrosilicon, other ferroalloys and direct castings:					
Made with—					
Coke		$		$	$
Bituminous coal and coke mixed		$		$	$
Anthracite coal and coke mixed and anthracite alone		$		$	$
Charcoal		$		$	$
Electricity, charcoal and electricity, etc.		$		$	$
Total					$

For interplant and department consumption; ..... Gross tons
For sale ..... ; ..... Gross tons
Total pig-iron production ..... ; ..... Gross tons
Blast-furnace gas for fuel for steam and for gas engines:
Blast-furnace department ..... ; ..... Cu. ft.
Other departments (steel works and rolling mills, etc.) ..... ; ..... Cu. ft. Value $
Total ..... ; ..... Cu. ft.
Slag (granulated, slag sand, slag for roofing, etc.) ..... $
All other products ..... $
Amount received for custom work ..... $
Total ..... $

4. Production of pig iron, by grades—gross tons:

Grades	For interplant and department consumption	For sale	Total
Bessemer (from 0.04 to 0.10 per cent in phosphorus)			
Low phosphorus (below 0.04 per cent in phosphorus)			
Basic			
Forge or mill			
Foundry			
Ferrosilicon, including Bessemer ferrosilicon (7 per cent and over in silicon)			
Malleable Bessemer			
White and mottled miscellaneous grades			
Castings made direct from the blast-furnace:			
Cast-iron pipe and fittings			
All other			
Spiegeleisen (not less than 9 per cent of manganese)			
Ferromanganese (45 per cent and over in manganese)			
Ferrophosphorus			
Other ferroalloys (ferrotungsten, ferrotitanium, ferrovanadium), etc., (specify kind)			
Total pig iron and ferro alloys			

5. Pig-iron production—how cast or delivered:
Sand cast, ... tons; machine cast, ... tons; chill cast, ... tons; delivered in a molten condition to mixers, converters, open-hearth furnaces, electric furnaces, etc., ... tons.

6. Furnaces, active, idle, building, etc. Alternate stacks should be counted as two furnaces. If a furnace used two or more kinds of fuel during the year, indicate the kind of fuel used when last in blast.

Blast-furnace stacks:
(a) Number of completed stacks at end of year (do not include stacks rebuilding) .....
Kind of fuel used by each when last in operation .....
Daily capacity of each (gross tons) .....
(b) Active during the year—
Coke: Number ..... ; daily capacity of each .....
Bituminous coal and coke mixed: Number ..... ; daily capacity of each .....
Anthracite and coke: Number ..... Anthracite alone: Number ..... ; daily capacity of each .....
Charcoal: Number ..... ; Charcoal and coke mixed: Number ..... ; daily capacity of each .....
(c) Electric furnaces for the manufacture of pig iron, ferroalloys, etc.
Type of furnace ..... ; number ..... ; daily capacity of each .....

New stacks completed since 1909: Number.....; fuel.....; daily capacity of each.....
In course of construction at end of year: Number.....; fuel.....; daily capacity of each.....
Rebuilding at end of year: Number.....; fuel.....; daily capacity of each.....
Idle during entire year: Number.....; daily capacity of each..... Kind of fuel used by each when last in operation.....
Abandoned or dismantled since 1909: Number.....; daily capacity of each.....; kind of fuel used when last in operation.....
Stacks operated with *dry air blast* (moisture extracted from the air): Number.....; kind of fuel used.....

Pig iron produced with dry air blast, gross tons.....

Longest blast terminating since 1909. Do not report if this length of run was less than that of the longest run terminating prior to 1910. (Do not consider furnaces out of blast when banked):

Date of run from.....to.....
Average daily output of furnace, tons.....
Number of gross tons of pig iron made during this period.....
Number of times furnace was banked during this period.....
Number of days lost by being banked.....

Best work:
Best production in 24 hours; tons made....., date.....
Name and dimensions of furnace.....
Best week's production; tons made....., date.....
Name and dimensions of furnace.....
Best month's production; tons made.....; month and year.....
Name and dimensions of furnace.....

7. Remarks:.....

The Southern Pig Iron Rate Reduction

Matthew Addy & Co., Cincinnati, make this comment on the reduction recently decreed in rates on Southern pig iron to Northern points: "This reduction was not expected. Two years ago it was asked, but the Interstate Commerce Commission had taken so long to consider the matter that most of the Southern ironmasters had come to regard the delay as a polite refusal. The decision brings great joy to the South, but it is almost a bombshell to Northern producers, who see the whole competitive situation changed. The new rates will be beneficial to all consumers of Southern iron in the Middle West and they will add a competitive burden to the Ohio and Chicago furnaces. The latter in particular have been doing their best to hold their own local market as a monopoly, but the less freight from the South will enable Southern irons to enter Chicago more easily than recently has been the case. Northern furnacemen, however, are already preparing to present their claims for a readjustment of their rates, so an interesting time may be expected."

Agreement on Iron Rolling Mill Scale

The Western Bar Iron Association and the Amalgamated Association reached an agreement on the wage scale at a conferenece in Chicago which closed Friday, July 10. The manufacturers receded from their demand for changing the dividing line between light and heavy sheet scrap from 19 gauge to 22 gauge, while a compromise was reached on puddling. Instead of the rate being advanced 75c. a ton throughout or to $6, an advance of 25c. was made on the base rate, making puddling $5.50 instead of $5.25, when bar iron is 1c., the increments decreasing until at 1.25c. bar iron the new rate is the same as the old, $6 a ton. The Republic Iron & Steel Company has accepted the scale in general. For the Moline, Ill., plant of this company a special scale was again agreed upon, being practically on the same basis as last year's except for the change in the puddling rate.

The Independent Pneumatic Tool Company, Chicago and New York, has leased the two-story building at 334 St. James street, Montreal, Quebec, and has arranged to open a branch store, where its Canadian business will be transacted after August 9. A complete line of Thor pneumatic tools, electric drills, accessories and spare parts will be carried in stock for immediate delivery on orders in Canada, and Thor users will receive service direct from the company in the future. W. H. Rosevear, who has been prominent for years in the railroad supply and machine-tool business in Canada, has been engaged as manager, and is now in Montreal.

Shipbuilding Statistics, Fiscal Year 1914

WASHINGTON, D. C., July 15, 1914.—Statistics compiled by Commissioner of Navigation E. Y. Chamberlain show that during the fiscal year ended June 30, 1914, there was a decrease in shipbuilding, as compared with 1913, of 22 per cent. in the number of vessels constructed and 18 per cent. in total tonnage. The vessels built and officially numbered in 1914 aggregated 1291, of 311,578 gross tons, compared with 1648 vessels, of 382,304 gross tons, for the year 1913. The decrease was chiefly in vessels of less than 1000 tons and is believed to be due to the general business depression of the past year, which has made it difficult for small concerns to finance their enterprises, while big corporations with larger resources have carried them through without regard to considerations of immediate profit.

The following table presents a comparative statement of shipbuilding of all classes for the two fiscal years:

	Atlantic and Gulf		Pacific		Great Lakes		Western Rivers	
Wood	No.	Gross	No.	Gross	No.	Gross	No.	Gross
1914	600	77,435	312	21,579	113	6,118	125	3,772
1913	675	94,584	413	28,641	199	7,547	197	4,458
Metal								
1914	77	131,810	12	13,838	31	54,577	14	2,276
1913	68	144,732	16	17,533	48	81,637	16	2,837
Total								
1914	677	209,245	324	35,417	144	60,695	139	6,048
1913	743	239,416	429	46,174	247	89,184	213	7,295

In the construction in the fiscal year 1914 the principal vessels reported are four American-Hawaiian Company steamships, each of 6600 gross tons, and three Grace Company steamships, each of 6300 gross tons, all for the Panama Canal trade, and averaging 4000 net tons. The steamship Matsonia, for Hawaiian trade, 9728 gross tons, is the largest vessel built in the United States since 1905, and the John D. Archbold, 8374 gross tons, is the largest oil tanker yet built in the United States. On the Great Lakes 10 steamers of over 1000 tons each were built, the Alton C. Dustin, 7978 gross tons, being the largest. Only three large schooners were built.

Through the courtesy of Commissioner Chamberlain the correspondent of *The Iron Age* is enabled to present the following detailed data regarding the vessels of 1000 gross tons and over built in the fiscal year 1914:

Name.	Gross tons	Where built
Seaboard.		
Steel steamers		
Matsonia	9728	Newport News, Va.
John D. Archbold (tanker)	8374	Do.
Manoa	6805	Do.
Iowan	6649	Sparrows Point, Md.
Ohioan	6649	Do.
Panaman	6649	Do.
Washingtonian	6649	Do.
Santa Catalina	6309	Philadelphia, Pa.
Santa Cecilia	6309	Do.
Santa Clara	6309	Do.
Frank H. Buck (tanker)	6076	San Francisco, Cal.
Atlantic	5330	Quincy, Mass.
Topila	5125	Newport News, Va.
Hampden	4725	Camden, N. J.
Tyler	3928	Do.
Manhattan	3539	Wilmington, Del.
Lewis K. Thurlow	3178	Newport News, Va.
Amolco	3074	Quincy, Mass.
Alameda	2302	Oakland, Cal.
City of Annapolis (bay)	1923	Sparrows Point, Md.
City of Richmond (bay)	1923	Do.
Mayor Gaynor (bay)	1634	Camden, N. J.
Edward T. Jeffrey	1578	Oakland, Cal.
Alvarado	1522	Long Beach, Cal.
Catskill (river)	1400	Newburgh, N. Y.
Wooden schooners		
Penn	1849	Bath, Maine
Exeter	1780	Noank, Conn.
Irene	1206	Bath, Maine
Great Lakes.		
Steel steamers, lake trade		
Alton C. Dustin	7978	Lorain, Ohio
Robert L. Ireland	6387	Do.
William H. Donner	6311	Ashtabula, Ohio
Howard M. Hanna, Jr.	6204	Cleveland, Ohio
Huron	4810	Ecorse, Mich.
South American	2662	Do.
Adrian Iselin	2072	Wyandotte, Mich.
Hydro	1282	Manitowoc, Wis.
William D. Crawford	6385	Lorain, Ohio
Steel steamers, ocean trade		
Brilliant	2486	Lorain, Ohio

The above table shows that there were built in 1914 38 vessels of 1000 tons or over, aggregating 169,099 tons. These compare with 52 vessels, aggregating 177,345 gross tons, in 1913. W. L. C.

Modern American Blast Furnace Practice

(*Continued from page 155*)

taken by fewer men of higher skill. The operation of charging our furnaces has reached such a remarkable degree of perfection that three men are able to fill two 500-ton stacks, and do it with greater accuracy, better control and less physical effort than ever before.

Suitable hearth construction has decreased the daily number of casts. At several plants only four casts are made in 24 hr. At the South Works three casts per day is the rule, 150 to 200 tons and more being tapped at a time. It is quite possible that in the future, with further enlargement of the crucible, no casts will have to be made on the night turn. Big ladles and mixers of large capacity are indispensable in this development. The latter have the further advantage of eliminating the most objectionable and wasteful part of blast furnace operations—the casting in sand beds or pig machines and the remelting of a considerable portion of the product. In Germany some plants today have a sufficient mixer capacity to hold all the Sunday iron for direct conversion.

THE HUMAN ELEMENT

To achieve uniformly good practice nothing is more essential than the building up of an intelligent, watchful and active furnace organization. The close co-operation of the foreman and the crew is needed to control efficiently every step in the operation. So much depends on correct discernment and quick action that an alert crew will in a day's work avert many troubles. Being continually in close contact with the furnace, they must be relied upon to watch the many little yet important details of operation.

The furnace manager who fails to devote as much of his thought and energy to studying and improving his organization as he gives to correcting the design of his plant misses one of his best opportunities. Any effort on his part to instil into his men a keener interest in the efficiency of the plant will make his task the easier. He should not hide his practice, but should display the daily, weekly and monthly results in all their details, so that his men, from the constant observation of these, will derive a better understanding of their work and become more capable of doing it justice. By also giving them the opportunity to study rival plants, the incentive to greater effort is further stimulated. In no branch of industry is the exchange of experience more helpful and necessary to progress than in blast furnace work. And this method should be applied not alone to the management. Modern mechanical appliances have raised the standard of the men employed around a furnace; to keep their intellect alive and bent to their work is the command of economy and progress. Some of the best suggestions for improving operation and construction are obtained from the rank and file of the organization.

A crew convinced that their employer takes an interest in their welfare will perform their duties willingly and cheerfully, and therefore efficiently. With the assistance of modern engineering, the safety campaign has not only succeeded in making the blast furnace plant, which in former days abounded in dangers, a safe and healthy place of work, but has exercised a most beneficial influence on the spirit and progressiveness of blast-furnace organizations, especially where safety matters have been referred to the workmen themselves for suggestions and improvements of their own invention.

The betterment of the human element, which enters into every step of the process from the mining of the raw materials to the casting of the molten product, perhaps does not stand out as strikingly as the more apparent results achieved by modern engineering; yet great progress has in recent years been made in this direction, and the good results obtained in modern blast-furnace practice are in no small measure due to the better spirit and greater intelligence of the workers.

OPPORTUNITY FOR PROGRESS

In every art and industry the living generation, having reached a certain goal, is prone to believe that no further progress is possible. At the present time, with furnaces producing 500 tons and more daily from difficult ore mixtures, with fuel consumptions which we think closely approach the low limit, we may not see our way clear to further improvement; yet the possibilities are now as great as ever. Perhaps they lie in another direction, and we need not be discouraged if we fail to develop the 1000-ton furnace or are unable to lower our past fuel records.

Our problem, I am convinced, is to reclaim and put to use those vast bodies of ore and coal which, owing to their adverse character have in the past not been available for the manufacture of iron. This is by far our greatest task, a task which has the highest economic value in substantially contributing to our country's wealth.

The magnitude of the unit with which we deal, the large responsibilities involved, the long period of time which must elapse before new ideas are approved by practice or condemned, the many disappointments with which all of us have met, are bound to make us cautious and conservative. Yet in this age, where science and engineering have put at our command resources undreamed of by our predecessors, we will, I trust, in the daily drudgery of making pig iron, keep sight of our wonderful opportunities and do our share in advancing the blast-furnace art.

Reduction in Virginia Pig Iron Rates to New England and Middle Atlantic States

The Interstate Commerce Commission on July 9 ordered a reduction in pig-iron rates from Virginia to points in New England and the Middle Atlantic States. The decision was in the case of the Lowmoor Iron Company et. al. versus the Chesapeake & Ohio Railroad et. al. The commission finds that the pig-iron rates for Virginia furnaces to the districts named are unreasonably high as compared with rates quoted to producers of pig iron at competing points in Pennsylvania and New York. New tariffs were ordered in effect as of August 15 reducing the rate to Baltimore from $2.45 a ton to $2.25; the Philadelphia rate from $3 to $2.75; the New York rate from $3.95 to $3 and the Boston rate from $3.75 to $3.25. In the original petition the rates complained of were called excessive because of the large proportion demanded and received by the Pennsylvania Railroad. As the complainants alleged, a comparison of rates from different districts indicated that "generally speaking the rates from Virginia furnace to destinations substantially equally distant from furnaces in Pennsylvania and New York are from 30 to 50 per cent. higher." The old rate from Virginia furnace to Boston, for example, figured out 5.8 mills per ton mile. From Pittsburgh to Boston it was 4 mills; from other western Pennsylvania points 4.1 and 4.2 mills and from Buffalo, 4.9 mills.

The Albany Malleable Iron Company, Albany, N. Y., has increased its capital stock from $150,000 to $350,000.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

WHEN PRICE COMBINATION IS LAWFUL.—Competitors in business may, for the purpose of terminating a disastrous competition, agree that they will not sell their goods at less than certain prices, if they do not control the supply of that kind of goods, and if the prices are not excessive. (New York Supreme Court, Appellate Division, Second Department, Kohart vs. Skou, 147 New York Supplement, 509.)

LIABILITY OF MERCANTILE AGENCIES.—A mercantile agency is liable for damages sustained by a patron as a direct result of negligent performance of a contract to furnish information concerning the credit and financial standing of a certain dealer. (New York Supreme Court, Appellate Division, Third Department, People vs. May, 147 New York Supplement, 487.)

EMPLOYER'S RESPONSIBILITY FOR DEFECT IN APPLIANCE.—An employer is responsible for injury to a workman caused by defective condition of a ratchet wheel of a chain hoist, whereby a load fell upon the employee, notwithstanding the facts that the defect was discoverable only by removing the covering of the wheel and was caused by defective material used by the manufacturer of the device. "To hold the defendant responsible for this accident is to say that it is the duty of the master to tear down and look into all of the parts of a device which he has purchased of a standard maker, in order to discharge the duty of inspection. Such liability did not exist at common law, but the language of subdivision 1 of section 200 of the labor law may be construed as enlarging upon the liability of the master in this regard." (New York Supreme Court, Appellate Division, Third Department, Van Ness vs. General Electric Company, 147 New York Supplement, 411.)

CONTRACTS WHICH NEED NOT BE IN WRITING.—As a general rule, a promise to pay an obligation of a third person is invalid unless reduced to writing, but where a company which had a subcontract to furnish beams for a building refused to make further delivery because the contractor had failed to pay for prior deliveries, a verbal promise by the owner and lessees of the building that, if the company would complete its contract, they would pay the full price, binds them, since such a promise is deemed to be an original undertaking on the part of the owner and lessees, for their own benefit. (New York Supreme Court, Appellate Term, Cooper & Polak Structural Iron Works vs. Rosing, 147 New York Supplement 241.)

TEST OF EMPLOYER'S LIABILITY.—Independently of the workmen's compensation laws, an employer is not responsible for injury to an employee, unless the former has been guilty of negligence, and unless the accident was a direct result of such negligence. (Oregon Supreme Court, Merrill vs. Missouri Bridge & Iron Company, 140 Pacific Reporter 439.)

WARRANTY OF SECOND-HAND MACHINERY.—In a sale of second-hand machinery there is no implied warranty on the part of the seller as to its condition, but his agreement to put it in first-class condition constitutes a warranty that the machine will be free from structural defects and will perform its functions in a reasonably satisfactory manner. (Washington Supreme Court, Fairbanks Steam Shovel Company vs. Holt & Jeffery, 140 Pacific Reporter 394.)

REQUISITES OF CONDITIONAL SALE CONTRACT IN MAINE.—Under the laws of Maine a contract for sale of a machine or other chattel, to be valid, must be reduced to writing and be signed by the buyer. (Maine Supreme Judicial Court, Pendleton vs. Poland, 90 Atlantic Reporter 426.)

COMPETITION WHICH IS NOT ACTIONABLE.—When a manufacturer's contract with a trade journal for advertising authorizes him to cancel the contract on the publisher printing advertisements of products which infringe his patents, a competitor is not entitled to relief against such manufacturer for notifying the publisher that publication of the competitor's advertisement would render the contract subject to cancellation. (United States Circuit Court of Appeals, Second Circuit, H. W. Johns-Manville Company vs. Lovell-McConnell Mfg. Company, 212 Federal Reporter 923.)

AUTHORITY OF CORPORATE TREASURER.—The fact that one is treasurer of a manufacturing corporation gives him no implied authority to make or indorse notes in the company's name; such authority must be conferred by the by-laws of the corporation, or by action of the board of directors. (New York Court of Appeals, Jacobus vs. Jamestown Mantel Company, 105 Northeastern Reporter 210.)

EMPLOYER NOT RESPONSIBLE FOR MERE ACCIDENT.—A molder in a factory could not recover for injury sustained in walking over an iron grating, if the injury be directly attributable to his losing his balance and falling, and not to any defect that may have existed in the grating. Negligence on the part of an employer in permitting a defective condition to exist is not actionable unless the direct cause of injury. (Indiana Appellate Court, Kokomo Brass Works vs. Doran, 105 Northeastern Reporter 167.)

EMPLOYER'S INTEREST IN EMPLOYEE'S INVENTIONS.—Where an inventor of a plunger elevator valve assigned all of his rights in the invention to a corporation, which agreed to employ him, and promised that all future inventions made by him during his employment pertaining to elevator valves, plugs or methods of elevator control should belong to the company, the corporation is entitled to the benefits of any invention made by him relating to a method of plunger elevator control, and not merely of inventions relating to the devices already invented. (United States Circuit Court of Appeals, Second Circuit, Standard Plunger Elevator Company vs. Stokes, 212 Federal Reporter 893.)

SCOPE OF MONOPOLY IN USE OF TRADEMARK OF TRADE NAME.—Right to monopolize a trademark or trade name is limited to the particular class of articles to which it is applied. Hence, a manufacturer of Simplex motor cars cannot complain of the use of that name by a manufacturer of fire extinguishers. (New York Supreme Court, First Appellate Division, Simplex Automobile Company vs. Kahnwriter, 147 New York Supplement, 617.)

DAMAGES FOR REFUSAL TO DELIVER ARTICLES INTENDED FOR RESALE.—One who contracts to sell articles for resale by the purchaser is liable for the amount of profits lost by the latter through the former's refusal to make deliveries called for by the agreement. (Utah Supreme Court, Schwab Safe & Lock Company vs. Snow, 140 Pacific Reporter 761.)

DUTY TO WARN AGAINST MISUSE OF COMPRESSED AIR —A manufacturing company which uses compressed air in its plant, and permits the nozzle of a hose carrying the air to lie where an inexperienced employee, and especially a youthful one, may turn it upon a coemployee, is under a legal duty to warn him against the danger of so doing. (North Carolina Supreme Court, Robinson vs. Melach Mfg. Company, 81 Southeastern Reporter 681.)

WHEN EMPLOYEE DOES NOT ASSUME RISK.—When a workman is required to work near an unguarded shaft, under a promise that a guard will be installed, the employer is liable for injury to him, not caused by his own contributory negligence, during such period as amounts to a reasonable time for performance of such promise. (United States Circuit Court of Appeals, First Circuit, Odell Mfg. Company vs. Tibbetts, 212 Federal Reporter 652.)

EFFECT OF WARRANTY.—When a seller of a machine warrants it for a year, the warranty cannot be treated as a mere agreement on his part to keep it in repair during that period, and, if it proves to be defective, the purchaser will be entitled to rescind the purchase, if he acts promptly. (New York Supreme Court, Erie County, Miller vs. Zander, 147 New York Supplement, 479.) But a buyer who elects to rescind the contract for breach of warranty must offer to return the property before he can recover money paid on the purchase price. (New York Supreme Court, Appellate Term, Frieder vs. Rosen, 147 New York Supplement, 142.)

PERSONAL

G. F. Knapp, for the past six years manager of sales with E. N. Breitung & Co., Rockefeller Building, Cleveland, Ohio, miners and sellers of Lake Superior iron ores, has severed that connection but has made no definite plans for the future. He is a technical and practical metallurgist and has been associated with blast furnaces, steel works and iron ore mines for many years.

Lawrence Fitch, Milwaukee, Wis., has been elected president and treasurer of the Western Malleable Company, Beaver Dam, Wis., organized recently with a capital stock of $400,000 to continue the business of the bankrupt Beaver Dam Malleable Iron Company. Other officers elected are: Vice-president and general manager, Ernest E. Smythe, Milwaukee; secretary, M. A. Jacobs, Beaver Dam.

John Dix has been appointed structural engineer of the Carnegie Steel Company in charge of the structural and plate sales bureau, succeeding John C. Neale, who recently resigned to become president and general manager of the new Central Steel Company, Massillon, Ohio. Mr. Dix had been assistant to Mr. Neale.

Alexander G. Christie, associate professor of steam engineering, University of Wisconsin, has been appointed associate professor of mechanical engineering in the College of Engineering which Johns Hopkins University is now organizing and building.

R. H. Danforth, for the past six years with the U. S. Naval Engineering Experiment Station and the Post Graduate Department of Engineering of the U. S. Naval Academy, Annapolis, Md., has been appointed professor of mechanics and hydraulics at Case School of Applied Science, Cleveland, Ohio.

William H. Warren, superintendent of the rail-mill department of the Illinois Steel Company at Gary, Ind., since that department was placed in operation, has resigned to accept the general superintendency of the steel mills of the Brier Hill Steel Company, Youngstown, Ohio.

Herman Schneider, dean of the School of Engineering of the University of Cincinnati, and William Wirt, superintendent of schools of Gary, Ind., are this summer to make a study of the industrial education problem in New York City and to submit a comprehensive plan for trade schools to the city authorities. Dean Schneider has been retained by reason of the success of the co-operative scheme which he devised and put in execution in Cincinnati, Ohio. Superintendent Wirt has also earned a reputation for the system he has developed in the Gary schools.

Frank Cheske on July 1 presented his resignation to John D. Hibbard, commissioner of the National Metal Trades Association, having associated himself with the Hendee Mfg. Company, Springfield, Mass. His first connection with the association or its members began in 1903 in Chicago. In 1906 he became permanently attached to the commissioner's office and since that time he has been continuously in the service of the association.

Eli Joseph, president Joseph Joseph & Brothers Company, Woolworth Building, New York, sailed for Europe on Tuesday on the Lusitania, expecting to be absent until early in September.

W. A. Comstock, for many years secretary and treasurer of the Cleveland Wire Spring Company, Cleveland, Ohio, has been elected president of that company to succeed R. C. Moodey, deceased. J. W. Campbell, formerly assistant treasurer, has succeeded Mr. Comstock as secretary and treasurer. E. S. Page was re-elected vice-president and E. L. Farrow was elected assistant secretary and treasurer.

J. R. Traver has severed his connection as New York manager of the Cleveland Crane & Engineering Company and the Cleveland Punch & Shear Works Company and will go to his home at Wickliffe, Ohio, where he will remain a few months before taking up other work. Mr. Traver opened the New York office of the companies he has represented. He will be succeeded by F. P. Hurlbut, formerly of the Pittsburgh office of the companies.

Ira S. Bassett has become connected with the Betz-Pierce Company, Cleveland, Ohio, jobber in steel, and will represent that company throughout central Ohio, having his headquarters in Columbus. He is a son of Ira B. Bassett, who was at the head of the former jobbing house of the Bassett-Presley Company, Cleveland.

Prof. James F. Kemp, professor of geology, Columbia University, and past president of the American Institute of Mining Engineers, has sailed for Colombia, South America, to examine some iron-ore deposits.

F. C. Kent, general superintendent of the Pierce-Arrow Motor Car Company, has severed that connection to become works manager of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio.

The American Manganese Mfg. Company

The American Manganese Mfg. Company, Philadelphia, Pa., has formally taken over the holdings of the Dunbar Furnace Company at and in the vicinity of Dunbar, Pa. The deeds are dated July 1. The purchasing company takes over the properties of the Dunbar Furnace Company; of Samuel L. Dickson, except store property; the Dunbar Coal & Coke Company at Dunbar; the Cuyuna Mille-Lacs Iron Company of Minnesota; 160 shares of the Dunbar Electric Company, 10 shares of the Dunbar Water Company and the interests of the Dunbar Furnace Company in the Semet-Solvay Company. Some parcels of land were excepted, being subject to the payment of various mortgages. The transfer of the lands of the Dunbar Furnace Company is subject to the satisfying of settlements of judgments and mortgages of about $134,000. Notice has been filed at Harrisburg, Pa., by the American Manganese Mfg. Company of the authorized increase of its stock from $5000 to $12,000,000, and of authority to incur debt to the extent of $1,250,000.

Westinghouse Strike Ended

The strike in the Westinghouse Electric & Mfg. Company, Westinghouse Machine Company and Pittsburgh Meter Company, East Pittsburgh, Pa., is over. The 10,000 strikers, at a great mass meeting held July 9, decided to go back to work this week practically on whatever terms the Westinghouse managers see fit to offer them. These terms, it is expected, will be generous, for it is known that the managers have been loath to employ new workmen so long as the men who have been with them for years showed the slightest disposition to compromise their differences with the companies. The employees expect the employers to make good their promise to adjust the matters complained of after they have returned to their tasks. The strike had lasted about five weeks.

The United States Light & Heating Company, Buffalo, N. Y., was placed in the hands of receivers July 13 on the application of a committee of preferred stockholders in their efforts to oust several members of the directorate. The company has recently endeavored to place $1,500,000 in 6 per cent. bonds, the proceeds of which were to have been used in paying off $450,000 of short term notes and about $160,000 of other indebtedness. It owns patents of storage batteries used to light and heat cars and also manufactures car heating and lighting apparatus. The United States District Court at Buffalo has appointed as receivers G. Henry Ackermann, Niagara Falls; Guy M. Walker, New York City, and James O. Moore, Buffalo.

The Machinery Markets

Though business continues quiet so far as actual orders are concerned, there is a growing realization that machinery and equipment needs are accumulating and there is much anticipation of what will come when confidence is restored and the railroad freight rate decision is out of the way. In New York the trade has in hand the revised list of the Seaboard Air Line, and good activity is promised for the fall, if not before. In Chicago orders are scarce, but hopes are centered in autumn activity. Inquiries are a little brisker in Detroit, and there is a fair run of single tool orders, but trade is still light. Conditions are unchanged in Cleveland so far as the domestic trade is concerned, but foreign orders are being received in rather good volume, and foundry activities are slightly better. Cincinnati reports a lifeless market both as to new and second-hand tools. In Milwaukee the week was fair, particularly in regard to inquiries, although orders continue to be scattered. Activity in the building trade is promising in the Central South, and some demand is being furnished by electric light and automobile repair plants. Texas continues to report good crops, which will mean business there. The feeling in St. Louis is improved generally, with the aggregate of single-tool requirements and tentative inquiry satisfactory to the trade. In the Pacific Northwest few important orders for machine tools are appearing, but there is considerable interest in a list of heavy tools for the Puget Sound Navy Yard, for which estimates were received June 26.

New York

NEW YORK, July 15, 1914.

The quiet of the past several weeks has not changed to any appreciable extent and current business still is confined to small and scattered sales. In some directions, however, there is a more hopeful spirit, partly due to a realization of accumulating prospects and also to the revised list of the Seaboard Air Line which is now in the hands of the trade. The number of tentative prospects which salesmen have accumulated promises a busy time when they mature. A good part of these consist of machines admitted to be needed by manufacturers, some of whom are reasonably busy, but who cannot at this time be brought to the point of buying. Most of them dismiss the subject by saying that in the fall they probably will "do something." There are a number of such firms in and around Philadelphia and elsewhere. New York machinery firms are carrying railroad prospects which are many months and in some cases a year or more old, but they are still regarded as being good. One of these is a list which the Lehigh Valley Railroad put out several months ago on which no definite action was ever taken. When the railroad freight rate decision is announced, several of the roads, including the Pennsylvania, are expected to lose little time in coming into the market. Statements to this effect were made by railroad men at the recent machine tool exhibit at Atlantic City. The ten turret lathes required by the Frankford Arsenal, Philadelphia, have been placed after a close contest which included a sort of open meeting at which several representatives of different manufacturers assembled and made their claims pro and con. The affair caused the commanding officer of the arsenal to remark that the salesmen must find business poor when they would fight so energetically for ten machines, most of them small.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the contract for the construction of a ten-story factory of reinforced concrete construction, which will contain approximately 30,000 sq. ft. of floor space, to be erected on Front street, near Fletcher street, New York City, for the L. E. Waterman Company, manufacturer of fountain pens. Ludlow & Peabody, 101 Park avenue, New York City, are the architects. The cost of the building will be about $80,000.

C. Mattison, Newark, N. J., plans to build a two-story factory at 161-167 Ogden street, 80 x 90 ft., at an estimated cost of $18,000. Plans call for a four-story structure ultimately. W. Orrin Bartlett, 738 Broad street, Newark, is the architect.

The Universal Flexible Conduit Company, 107-109 Tichenor street, Newark, N. J., has leased a factory where it will manufacture metal hose.

The Driver-Harris Wire Company, Harrison, N. J., has filed plans for the erection of a one-story building, 75 x 120 ft., to cost about $12,000. It will be used for cold rolling

The Manhattan Mfg. Company, Nelson avenue and Poplar street, Jersey City, N. J., plans to build a two-story addition, 50 x 58 ft., to its factory, to cost about $8000.

The machine shop and foundry buildings to be erected by the Taber Pump Company at Elm and Clinton streets, Buffalo, are to be 117 x 145 ft., one story, and 38 x 95 ft., two stories, respectively. A considerable quantity of new machinery and other equipment will be purchased.

The Buffalo Lounge Company, Exchange and Hamburg streets and the Erie Railroad, has commenced reconstruction work on its factory which was recently partially destroyed by fire.

The Springfels Mfg. Company, Buffalo, manufacturer of paper boxes, has let the contract for the construction of a factory 40 x 80 ft., two stories and basement, at East Utica and Michigan streets.

Hurd Brothers, Buffalo, hardwood lumber manufacturers, have purchased a site of 26 acres at Bailey avenue, Dingen street and the Lackawanna Railroad, on which they will erect a plant for the manufacture of hardwood trim, etc.

The citizens of Lestershire, N. Y., at an election held last week, voted in favor of constructing a pumping station for its waterworks. W. C. Lewis is the village clerk.

The Buffalo Package Company, Buffalo, manufacturer of tight barrels, etc., will build an addition 54 x 75 ft., with ell 30 x 36 ft., to its plant at Babcock street and the Erie Railroad.

The King Sewing Machine Company, Buffalo, has let the contracts for additions to its foundry, 70 x 117 ft., 25 x 250 ft., and 25 x 40 ft.

The Public Service Commission of the State of New York has approved the application of the Jamestown, Westfield & Northwestern Railroad Company, Jamestown, N. Y., to change from steam to electric motive power and to issue necessary securities to provide for re-equipment.

The Sterling Engine Company, Buffalo, manufacturer of gasoline engines, will add a testing room 35 x 80 ft., to its plant on Niagara street.

The Fleckenger Bros. Company, Bradford, Pa., of which L. F. Dresser is president, has completed plans for the erection of a plant at Ellicottville, N. Y., including a foundry and machine shop, each 80 x 120 ft. Upon completion the company will move to Ellicottville. The capital stock is to be increased from $75,000 to $150,000.

The Borden Condensed Milk Company, 108 Hudson street, New York City, will rebuild its tinshop at Ellicottville, N. Y., which was recently destroyed with a loss of $60,000 on building and machinery.

New England

BOSTON, MASS., July 14, 1914.

Men in business and banking are speaking more hopefully of business conditions and some manufacturers are strong in their expressions of confidence that the turning point has been reached and that from now on, taking into account the hot weather, improvement will be constant. The demand for machine tools continues about the same. A few good orders have been received by the builders and scattering business remains in about the same volume. The demand is irregular and intermittent.

The Phillips Insulated Wire Company, Pawtucket, R. I., has completed plans for the large extension of its plant which has already been noted. The buildings will be located across the street with the old, connections being maintained by means of tunnels. The mill building will be about 200 x 200 ft., three stories and basement, of heavy construction, including iron columns and steel beams. The power house will be 60 x 100 ft. and 40 ft. high. Eight boilers will generate 2400 hp., and there will be two 600 kw. turbo-generators. The additions will have most modern equipment throughout.

Work is about to begin on the large additions to the

naval torpedo station at Newport, R. I. The machine shop extension will cost $260,000, and will occupy 35,000 sq. ft. of ground space. A storehouse will have 15,000 sq. ft. of floor space. The structures will be of brick and reinforced concrete.

C. J. Bates & Son, Chester, Conn., manufacturers of cutlery, plan the erection of two additions, one 30 x 70 ft., two stories, the other 25 x 25 ft., one story.

The Union Hardware Company, Torrington, Conn., will build an additional factory, 22 x 71 ft., one story.

The plant of the Eagle Foundry, Salem, Mass., owned by A. H. Smith, which was burned in the great fire, will be rebuilt as soon as possible. George C. Vaughan will build two factories at Salem, one 45 x 250 ft., three stories, the other 50 x 150 ft., two stories. The buildings will be rented for manufacturing purposes.

The Essex Associates, Haverhill, Mass., have commenced the building of an eight-story factory 50 x 222 ft.

The Rockland Webbing Company, Rockland, Mass., will erect a modern plant on mill site recently acquired.

The Stanley Works, New Britain, Conn., has awarded the contract for an additional factory building, which will be 64 x 200 ft., seven stories, of reinforced concrete construction.

The Taplin Mfg. Company, New Britain, Conn., has been organized to manufacture brass goods. E. E. Goodwin, New Britain, is president, George J. Angerbower, Forestville, vice-president, and Arthur Goodrich, Middletown, secretary and treasurer.

One of the mills of the C. M. Robertson Paper Company, Montville, Conn., was burned July 6, with a loss of $50,000.

Philadelphia

PHILADELPHIA, PA., July 14, 1914.

The Quaker City Rubber Company, 629 Market street, Philadelphia, is building a four-story factory and warehouse, 60 x 150 ft., of reinforced concrete and brick construction. It will be used principally for storage and as an overflow building.

John Brown Sons & Co., Philadelphia, plan the erection of a shop building, three stories, of brick construction, to cost about $5000, to be erected at 2211 Turner street. A. Raymond Raff, 1635 Thompson street, is the architect.

The Hickok Mfg. Company, Harrisburg, Pa., manufacturer of bookbinders' machinery, etc., plans to start work in about six months on a complete new factory. The specifications will call for new foundry equipment for both brass and iron foundries, some iron and wood working machinery and small traveling cranes. Day & Zimmermann, 611 Chestnut street, Philadelphia, Pa., are the engineers.

The Ritter Mfg. Company, 309-311 Green street, Philadelphia, has been organized to do the tin-can manufacturing business required by the P. J. Ritter Conserve Company. The company expects to go into the manufacture of tin cans and boxes on a very much larger scale than heretofore, and will also enlarge its department for the lithographing of tin plate and metal signs. Considerable new machinery will be added to the equipment as soon as the new factory is completed. J. C. Gibbs is general manager.

The Miller Lock Company, 4523 Tacony street, Frankford, Philadelphia, plans the construction of a one-story boiler house. Heacock & Hokanson, Bailey Building, are the architects.

The Panther Valley Electric Light Company, Lansford, Pa., will build a power station of brick and concrete to cost about $7000. Jacoby & Weishampel, Commonwealth Building, Allentown, Pa., are the architects.

Chicago

CHICAGO, ILL., July 13, 1914.

The contrast between the realities of the present and the increasingly optimistic hopes for the early fall is still marked with great clearness in the machinery market. Orders are not more plentiful as yet nor has the expectation of later business resolved itself into many specific inquiries. The request for prices by the Illinois Central Railroad on a list of tools appears to be very indefinite in the probable time of closing. It is reported that the Rock Island has completed arrangements for new shops at Rockdale, Ill., near Joliet; but all plants for expenditures by this system must be taken with reservations in view of its financial situation. There is insistent report that the railroads are quietly going ahead with a much larger volume of maintenance work, but in this market this has not yet taken form in connection with machine-tool purchases. The operations of manufacturing plants in general are slightly improved, but much more pronounced improvement will have to materialize before a more liberal inclination to invest in new equipment is likely to be felt.

The Grand Trunk Railway Company's round house at Forty-ninth street and Kedzie avenue, Chicago, was destroyed by fire with a loss of about $10,000.

The Peerless Appliance Company, Chicago, has been incorporated with a capital stock of $100,000, to manufacture and deal in mechanical appliances. The incorporators are Richard W. Poelma, Herman F. Sorum and Theodore J. Kuettler, 2067 North Mozart street.

The Davis Automobile Accessories Company, Chicago, has been organized with a capital stock of $25,000 to manufacture and deal in auto supplies, specialties, accessories, etc., by E. M. Oehler, A. S. Kedzie and Harry Garrett, 3133 Indiana avenue.

The George Stiefel Company, 4651 Gross avenue, Chicago, machinist, is planning the establishment of a branch factory at Joplin, Mo., for the manufacture of pressure pumps. An investment approximating $150,000 is contemplated.

The Sandbo Starter Company, Rock Island, Ill., has been incorporated with a capital stock of $10,000, to manufacture and deal in engine starters, etc. The incorporators are H. W. Danimann, Albert G. Arp and A. I. Sandbo.

The Thomas Guinter Mfg. Company, Rockford, Ill., has been organized with a capital stock of $25,000 by Charles S. Thomas, W. S. Guinter, James H. Thomas and S. E. Guinter, to manufacture and sell washing machines. C. S. Thomas & Sons have been engaged in the manufacture of stairs, cabinets and fixtures and made the wooden parts of the Guinter machine and the new corporation combines the two.

The Citizens Pure Ice Company, Jacksonville, Ill., has been incorporated with a capital stock of $25,000 by W. J. Achelpohl, C. D. Johnson and E. W. Fowler, of Peoria.

Attorney J. M. Powers, Pekin, Ill., will receive bids until July 24 for the necessary equipment for the installation of a marine railway for transferring boats across drainage district levees; also power plant and other allied equipment.

The Wilson Bottling Company, Rockford, Ill., has been incorporated with a capital stock of $25,000 by C. A. Wilson, V. A. Bodorff and Harry Sodequist and will equip a bottling plant.

The Northern Pacific Railway Company will build a new roundhouse and locomotive repair plant at St. Paul, Minn., to cost in the neighborhood of $500,000. The present roundhouse and repair shop will be torn down to make room for the new buildings which will include, besides the round house, a large machine shop, a turntable, coal docks for loading locomotives, a tank and paint shop and a large store building.

The Stockland Road Machinery Company, Minneapolis, has been incorporated with a capital of $200,000 by C. K. Stockland, G. A. Stockland, A. G. Dunlop and Henry Doerr to manufacture road-making equipment.

The Dix Machine Company, Stillwater, Minn., manufacturer of a traction ditcher, is erecting an addition to its plant, the building being of concrete construction.

Milwaukee

MILWAUKEE, WIS., July 13, 1914.

Considering the season, business the past week may be said to be fair. Trade is very spotty and promises to continue so for some time. Tool builders report good inquiries, although bookings are few and far between as compared with normal. Expectations for the months of July and August are low, but thereafter the situation gives every hope of a revival. Industrial expansion throughout the State still exceeds that in Milwaukee, where general construction is under the record of last year.

The construction just undertaken by the Simmons Mfg. Company, Kenosha, Wis., manufacturer of metal beds, springs, etc., at a cost of $100,000, comprises three buildings, as follows: Gray-iron foundry, brass foundry and blacksmith shop, 60 x 200 ft.; machine shop, pattern shop and drafting room, 60 x 260 ft.; pattern storage vault, 40 x 125 ft. The machine shop will be equipped with an electric traveling crane of 10-ft. span and 260-ft. travel. The buildings will be of steel and brick. The contractor is the Kenwood Bridge Company, Chicago.

The Sheriffs Mfg. Company, South Water and Barclay streets, Milwaukee, Wis., manufacturer of propeller wheels, etc., whose factory was damaged by fire February 25, will hereafter confine its manufacture entirely to propeller wheel requirements and will discontinue its machine shop.

Fire extinguishing devices will be manufactured by the Erwin Company, Milwaukee, Wis., which has just been in-

incorporated with $32,000 capital by James B. Erwin, E. O. Erwin, Charles Schwartz, A. S. Weil and J. M. Barney. Suitable factory quarters have been leased and equipment is being installed.

Members of the Prime Steel Company, Milwaukee, have organized the Prime Mfg. Company to manufacture and market railroad supplies. The new corporation is capitalized at $25,000, with A. W. Prime and H. G. Wild as incorporators. Operations will be carried on in the present Prime works.

The Automatic Trip Carrier Company, Rice Lake, Wis., manufacturer of stable and barn equipment, has increased its capital stock from $50,000 to $100,000 and will use part of the new issue for the construction of a plant to replace the structures destroyed by fire recently.

The International Electric Tool Company, Milwaukee, incorporated with $20,000 capital, has elected William R. Sorgel president and William H. Gaulke, secretary. It will manufacture a line of electrical tools, such as chippers, sand shakers, riveting hammers, vibrators, etc. All of the backers are prominent in the electrical and general machinery trade of Milwaukee.

The Universal Crushed Stone Company, Racine, Wis., operating large limestone quarries, has increased its capital stock from $130,000 to $215,000 for the purpose of buying additional acreage and more excavating, hoisting and crushing equipment.

The Railway Materials Company, Chicago and New York, will start to equip its new brakeshoe plant at Stevens Point, Wis., this month. Work is progressing rapidly and the plant will probably be ready for operations before August 15.

The Northwestern Dredging Company, Grand Rapids, Wis., of which J. P. Arpin is president, is in the market for several steam shovels and other power excavating and dredging machinery for the $325,000 drainage contract awarded to the company by Marshall and Beltrami Counties, Minnesota.

The General Construction Company, Chicago, Ill., was awarded the general contract for rebuilding the plant of the West Bend Flour & Feed Company at West Bend, Wis., into a commercial light, power and heating plant for the West Bend Heating & Lighting Company. The project will require two 300-hp. vertical boilers, with Jones automatic stoking equipment, a Corliss engine, etc.

The David Roberts Veterinary Company, Waukesha, Wis., has purchased a building site, 150 x 500 ft., and proposes to build a large laboratory. David Roberts is president.

Louis G. Widule, county clerk, Milwaukee, closes bids July 20 for the construction and equipment of the heating and power plant for the new Milwaukee County Tuberculosis Sanatorium, Wauwatosa, Wis., to cost $650,000 complete.

The Chicago & Northwestern Railroad will install a new electrical pumping system in the roundhouse and shops at North Fond du Lac, Wis., to replace the steam equipment. A. J. Farrelly, Chicago, is electrical engineer.

Articles of incorporation have been filed by the Meinecke Mfg. Company, Milwaukee. The capital stock is $75,000 and A. K. Meinecke, Max R. Schade and A. A. Mueller are the incorporators. The company is not ready to divulge its plans.

The Draw Carrier Company, Waterloo, Wis., manufacturing automatic litter-carrying devices and other stable and barn equipment, has increased its capital stock from $50,000 to $100,000 and will enlarge its plant.

The Marathon Electric Mfg. Company, Wausau, Wis., has been organized to manufacture alternating and direct current motors in sizes up to 5 hp. A factory has been secured and machinery is being purchased. J. S. Alexander is president and E. M. Bischoff secretary and treasurer.

Indianapolis

INDIANAPOLIS, IND., July 13, 1914.

The McEntee Plow Company, Tipton, Ind., has been incorporated with $200,000 capital stock to manufacture plows. The directors are Joseph McEntee, Michael X. Kigin and W. H. Knause.

The Lafayette Sanitary Supply Company, Lafayette, Ind., has been incorporated with $5000 capital stock to manufacture metal and porcelain ware. The directors are E. C. Ward, W. F. Strate and L. E. Craig.

The M. C. M. Motor Company, Muncie, Ind., has been incorporated with $10,000 capital stock to manufacture automobiles. The directors are W. M. Mathews, Luther Cobb and E. L. Morris.

The Mid West Box Company, Anderson, Ind., has been incorporated with $100,000 capital stock to manufacture boxes, etc. The directors are W. H. Fairchild, J. U. Higgin botham and J. M. Starr.

Cleveland

CLEVELAND, OHIO, July 13, 1914.

Machinery orders are light and mostly for single tools, with little new inquiry. The domestic demand for automatic screw machinery is quiet, but there is a fair run of foreign orders. The demand for screw-machinery products is quite good. There is some demand from the automobile trade for gear cutters. In handling equipment small cranes and hoists are most prominent. Conditions in the foundry trade appear to be slightly better. Reports indicate that the heavy jobbing foundries in Cleveland are now operating at about 50 per cent. capacity and that the light foundries are running at from 60 to 75 per cent.

The Stove Improvement Company, Cleveland, has been incorporated with a capital stock of $10,000 to manufacture stoves, heaters and ranges. E. V. Coulston, formerly of the Economy Stove Company; E. A. Strucker, Lloyd Walker, and others, are the incorporators.

The Gustav Schaefer Wagon Company, Cleveland, will erect a four-story factory and repair shop.

The Otis Elevator Company, Cleveland, will erect a four-story brick, steel and concrete service and office building on East Sixth street.

The city of Toledo will shortly ask for bids for equipment for its new high service pumping station.

Hettrick Brothers, Toledo, Ohio, makers of tents, awnings and other canvas goods, have established a factory for the manufacture of belting. It will be in charge of J. S. Young as manager.

The director of public service, Columbus, Ohio, will receive bids July 23 for a compound horizontal condensing pumping engine with 10,000,000 gal. per day capacity, two horizontal compound condensing engines with a capacity of 12,000,000 gal. per day each, against a head of 200 ft. with 80 lb. of steam.

The Electro-Sanitation Company, East Palestine, Ohio, has been formed with a capital stock of $10,000 to erect sewage disposal plants. Ellis Roberts, Grant Hill, and others, are interested.

The Pittsburgh Foundry Company, Salem, Ohio, will enlarge its plant by a 50-ft. extension.

The Dennison Foundry & Machine Company, Dennison, Ohio, has been incorporated with a capital stock of $15,000 by Thomas Wright and others.

The Atlas Mfg. Company, Fostoria, Ohio, has acquired a site on which it will shortly begin the erection of a one-story brick factory building, 108 x 140 ft.

Detroit

DETROIT, MICH., July 13, 1914.

Dealers report a fair run of orders for single tools the past week, and a number of orders for miscellaneous equipment were placed. Inquiries are somewhat brisker and their character seems to indicate some improvement in the market. A number of new enterprises in the automobile and accessory fields are expected to begin manufacturing within the next few months and this is causing some interest among dealers. No change is noted in conditions in the foundry trade, and manufacturing machinists also report business as being dull. The call for second-hand equipment of most kinds is slack. No new industrial construction is reported by architects.

Dodge Brothers, Detroit, have filed articles of incorporation giving their capital stock at $5,000,000. The new company is composed of John H. Dodge, Horace E. Dodge and Alfred L. McMeans. The Messrs. Dodge were formerly connected with the Ford Motor Company and have heretofore made parts for Ford cars. They will now engage in the manufacture of automobiles also.

The Denby Motor Truck Company, Detroit, has been organized to manufacture automobile trucks. It has executive offices at 2036 Dime Bank Building, and is reported to have acquired a factory at Franklin and Dubois streets. The organizers are Garvin Denby, J. Walter Drake, Arthur Webster and L. C. Freeman, all of whom are prominently identified with the automobile industry.

R. M. Ackerman, Detroit, has awarded contracts for a one-story brick factory, which he will erect on Gordon avenue.

The Studebaker Corporation, Detroit, has acquired the large factory formerly occupied by the American Harrow Company, and will equip it for use as a service department.

The Master Carburetor Company, Detroit, has been incorporated with $250,000 capital stock by F. D. Buch, G. W. Williams and L. H. Lefferts, for the purpose of manufacturing carburetors.

The Wallace Shock Absorber Company, Detroit, has been incorporated with $5000 capital stock to manufacture stock absorbers. John E. and William J. Wallace and George C. McDonald are the incorporators.

The Princess Motor Car Company, Detroit, has been incorporated with $100,000 capital stock by C. D. Smith, W. H. W. Brennan, O. C. White, and others, to manufacture automobiles. It has secured a small plant at 348 Clay avenue which it plans to enlarge later.

The Northern Refrigerator Company, Grand Rapids, Mich., is adding a four-story manufacturing building. The addition will be used in part as an enameling room.

The W. H. Chase Furniture Company, Grand Rapids, Mich., is erecting a factory building, 25 x 50 ft., three stories.

The Fritz Mfg. Company, Grand Rapids, Mich., manufacturer of special furniture, is having plans prepared for two additions. The buildings will be used principally for storage and finishing purposes.

Williams Brothers, St. Joseph, Mich., manufacturers of paper boxes, are erecting a three-story addition, 20 x 30 ft.

Mill No. 3 of the Niles Board & Paper Company, Niles, Mich., was destroyed by fire July 8, entailing a loss of $80,000. It will be rebuilt.

Libby, McNeil & Libby have begun work on their new plant at Alma, Mich. The buildings to be erected at present include a boiler house, 28 x 50 ft.

The city of Benton Harbor, Mich., has completed plans for a manual training high school to cost $8500. M. J. Dunkirk is the architect in charge.

Fire damaged the plant of the Havers Motor Car Company, Port Huron, Mich., July 8, to the extent of $60,000. It is reported from Port Huron that the plant will be rebuilt.

The Carroll Light & Heating Company, Grand Rapids, Mich., has increased its capital stock from $50,000 to $100,000.

The plant of the Havers Automobile Company, Port Huron, Mich., was destroyed by fire. The loss is estimated at $100,000.

The Michigan Washing Machine Company, Muskegon, Mich., will put up a one-story addition at the north end of its present factory, 25 x 65 ft., to be of brick and cement. A new 200-hp. engine and new boiler will be installed.

Cincinnati

CINCINNATI, OHIO, July 13, 1914.

It cannot be denied that the machine tool trade appears to be steadily declining. While there are sporadic reports that are somewhat encouraging, the number of these is too limited to change the general situation. During the past week the export business has been small, and there has been practically no railroad buying of tools that has come to light. A few orders for replacement tools have been received from automobile manufacturers, but the total business from this source is still disappointing. While it is generally understood that the first half of July is always the dullest period of the year, the unpleasant feature of the present situation is that there are so few inquiries for machine tools of any kind. It is the announced intention of an additional number of local plants to close down during the remainder of the present month for repairs. This includes manufacturers in other lines than machine tools.

Dealers in both new and second hand machinery are doing very little and a few of them report a rather gloomy outlook. The jobbing foundries are gradually curtailing operations and they do not look for any improvement to be inaugurated during the summer months.

Joseph Bock, Camp Washington, Cincinnati, will construct a public garage. But little equipment will be needed.

George Welsh, 664 Greenwood avenue, Cincinnati, has let a contract for a public garage that will be 50 x 85 ft., and of fireproof construction. A small repair shop will be operated in conjunction with the garage.

Hughes & Alves, Commercial Tribune Building, Cincinnati, will soon be ready to receive bids on heating and temperature regulating equipment for a large public school to be erected at Highlands, Ky.

It is rumored, but not confirmed, that the United States Printing Company, Cincinnati, has purchased the plant of the Wright Paper Company, Middletown, Ohio, and that it will be enlarged for the manufacture of paper boxes and other specialties.

The Keyer Folding Box Company, Dayton, Ohio, has been acquired by L. R. Lindley, Marion, Ind. The plant has been idle for some time, and in addition to a general overhauling, its capacity will be increased.

The plant of the Apple Electric Company, Dayton, Ohio, will be moved to Newark, N. J., at an early date. The company recently suffered a fire loss estimated around $90,000. It manufactures automobile specialties.

The Patterson Tool & Supply Company, Dayton, Ohio, will soon move its headquarters to the Huffman Block. The company expects to build a garage and small repair shop in the rear of its new store for the storing and repairing of its auto-trucks.

The Rubicon Tool & Mfg. Company, Dayton, Ohio, has been incorporated by E. J. P. Hill and others, to manufacture metal specialties. Nothing is known as to machinery requirements.

R. R. Sanderson, Washington Courthouse, Ohio, is the head of a company that will manufacture a special line of oil and gas well equipment.

The clerk of the Board of Trustees, Clyde, Ohio, will receive bids until July 21, for steam pumps, etc.

Wheeling

WHEELING, W. VA., July 13, 1914.

The D. E. McNichol Pottery Company, Clarksburg, W. Va., has been incorporated with $300,000 capital stock to manufacture pottery and other earthenware by D. E., John A. and Hugh L. McNichol, East Liverpool, Ohio, and others.

It is reported a large enamel factory will be built in Bellaire, Ohio, or vicinity, by William Lipphardt and sons, Louis and Charles, of Martins Ferry, Ohio.

The National Garage & Bottling Works, Inc., Princeton, W. Va., has been incorporated with $10,000 capital stock. D. J. Meister is president.

The Athens Glass Company, Morgantown, W. Va., is adding three shops to its present equipment of 12. J. M. Wood is president.

The Everlasting Combined Casket & Vault Company, Huntington, W. Va., has been incorporated with $30,000 capital stock by G. E. Kesterson, A. R. Hatfield, M. J. Ferguson and others.

Birmingham

BIRMINGHAM, ALA., July 13, 1914.

While there has been a gradual improvement in the machinery trade, it is still so slow as to be unsatisfactory. The demand for machine tools has picked up owing to continued structural activity in and near Birmingham. The agricultural end of the business is also good. Lumber mills and mines are calling for equipment very sparingly. Many factories are calling for electrical equipment to be driven by power from the new hydroelectric plant on the Coosa River.

Permit has been issued at Birmingham for the construction of a $75,000 round house by the Southern Railway. A permit for a coal chute to cost $25,000 was also issued.

The Magic City Oil Company, Birmingham, has been incorporated by S. B. Brown, E. Y. Conklin and others to operate a cotton seed oil mill.

The Coosa Cooperage Company, Ragland, Ala., is rebuilding its plant recently destroyed by fire.

The Atlantic & Gulf Portland Cement Company, Ragland, Ala., recently sold at trustee's sale for $650,000, will be acquired by the Coosa Portland Cement Company, a new company to be organized with a capital stock of $200,000 with John B. Stevenson, Philadelphia, Pa., president. The plant is at present being equipped with motor-driven machinery.

The A. J. Spencer Lumber Company, Mobile, Ala., is having plans drawn by Clark Brothers, Indianapolis, Ind., for a sawmill to replace its burned plant. It will have a capacity of 50,000 ft. and will cost $25,000.

The Farmers Cotton Gin Company, Selma, Ala., of which W. O. Kenan is secretary, will build a gin to cost $10,000.

The Knox Stave Company, Mobile, Ala., has been incorporated by W. K. Knox, L. E. Moore and others, with a capital stock of $100,000.

The Ocala Iron Works, Ocala, Fla., will rebuild its plant burned several weeks ago.

The Georgia School of Technology, Atlanta, Ga., will install a power plant at a cost of $100,000.

The Central South

LOUISVILLE, KY., July 13, 1914.

Local conditions are perhaps better than those prevailing generally through this territory. One of the reasons for this is the large amount of building now going on. Many of the buildings are of considerable size, and give work for manufacturers of heating, ventilating and other equipment. The board of education of Louisville is spending $1,000,000 for new buildings this year, a work which is making trade good for the boiler concerns in spite of the fact that general business is slow. A few new electric light plants are starting up, and these, together with an occasional machine shop

for automobile repair work, are furnishing most of the demand for new machinery.

The James Clark, Jr., Electric Company, Louisville, has closed a large contract with J. R. Cover & Sons, tanners, Elkton, Va., and Augusta Springs, Va., covering the installation of complete electrical plants in these two factories. Generators, switchboards, motors, etc., will be furnished, the horsepower for the two jobs being about 500. The same concern has also sold the Kentucky Veneer Works, Louisville, 200 hp. in motors, which will be used for the operation of veneer saws, displacing steam equipment which has been used heretofore.

The Kentucky Paper Box Company and the Kentucky Corrugated Paper Company, associated concerns of Louisville, have purchased a factory and will be in the market for 12 motors, ranging from 2 to 12 hp. Most of the special equipment which will be installed has already been bought.

The Electric Garage Company, Louisville, has been organized with $25,000 capital stock and will install electrical equipment in a garage at Third and Bloom streets. George C. Bader and others are interested.

The machine shop of the Falls City Brewery, Louisville, was damaged by fire recently. A lathe, motor and other equipment were involved.

The Twin Mfg. Company, Courier-Journal Building, Louisville, has been incorporated with $30,000 capital stock and will manufacture washing machines. It will equip a plant at Floyd and A streets. A motor soldering equipment and sheet metal machinery will be installed.

The Federal Chemical Company, Louisville, is in the market for transmission equipment. William Astroth is superintendent.

The Tygart Electric Company, Olive Hill, Ky., has been incorporated with $8000 capital stock and will build an electric light plant and ice factory. Equipment will be purchased August 1. Address J. A. Maddox.

The Shepherdsville Electric Light, Ice & Water Company, Shepherdsville, Ky., has been organized with $10,000 capital stock by S. W. Bates, Conrad Maraman, and others.

The Middlesboro Electrical Works, Middlesboro, Ky., is equipping a machine shop which will specialize in electrical repairs. H. J. Herron, Clairfield, Tenn., and W. D. Householder, Knoxville, Tenn., are interested.

The Owensboro Ditcher & Grader Company, Owensboro, Ky., has been incorporated with $250,000 capital stock by W. A. Steele, R. S. Hughes, C. A. Rogers, and others, and will manufacture contractors' equipment. The machines are now being made under contract, but a factory will be erected as soon as the organization of the company is completed.

The Chandler Normal School, Lexington, Ky., announces plans for the erection and equipment of a manual training building. The school will spend about $100,000. F. J. Werking is principal.

The United States Motor Truck Company, Covington, Ky., has filed articles of incorporation. It has a capitalization of $250,000. R. C. Stewart and others are the incorporators, and it is understood that the plant of the Stewart Iron Works in Covington will be used temporarily for the manufacturing operations.

The Fulton Company, Knoxville, Tenn., which as recently reported has begun the erection of several new factory buildings, advises that most of the equipment has been contracted for.

The Nashville Motor Car Company, Nashville, Tenn., is building a factory on Broadway near Sixteenth avenue at a cost of $32,000, and will equip a machine shop for repair work.

John W. Blair, First National Bank Building, Nashville, Tenn., has announced that he will purchase a small refrigerating plant and other equipment.

The J. W. Adams Company, South Pittsburg, Tenn., has purchased the South Pittsburg Water Company and plans to make improvements.

J. E. Wilkinson, Bristol, Tenn., has begun the erection of a sawmill at Kingsport, Tenn., for which a considerable amount of machinery will be required.

Texas

AUSTIN, TEXAS, July 11, 1914.

During the past week a period of extremely hot weather prevailed all over Texas. It caused a falling off in the machinery and tool trade, but it is thought the lull is only temporary. Crop prospects continue good.

The Lone Star Gas Company, Ft. Worth, has increased its capital stock from $3,500,000 to $4,500,000 in order to provide funds for constructing a large gas compressor at Henrietta.

The Farmers' Cotton Gin Company, Windom, will construct a cotton gin. A. N. Wheelock is interested.

The Eastern Texas Traction Company, Dallas, has awarded the contract for completing its interurban electric railroad between Dallas and Greenville to the Stone & Webster Engineering Corporation, Boston, Mass. The contract calls for the construction of power stations, etc.

The Texas Power & Light Company, Austin, will install new machinery and make other improvements to its electric power plant at Temple.

H. Hardcastle, Millett, Texas, will construct a cotton gin at Gardendale. He will also erect a feed mill.

The Bisbee-Naco Water Company, Naco, Ariz., will reconstruct its waterworks plant. New machinery will be installed.

The Corpus Christi Compress Company, Corpus Christi, has been organized with a capital stock of $50,000 for the purpose of constructing a cotton compress. The incorporators are Thomas Bell, W. T. Bynum and W. E. Pope.

The Cisco Gas & Electric Company, Cisco, which has been organized with a capital stock of $50,000, will construct an electric light and power plant. The incorporators are W. S. Michael, W. H. Tebbs and G. C. Ward.

St. Louis

ST. LOUIS, MO., July 13, 1914.

A generally improved feeling in the market is leading to a really better business, all things considered, than was expected for this period of the year. An increased interest in equipment is noticed, and while there were no large lists put out, there was an aggregate of single tool requirements and tentative inquiry that was quite satisfying. The accentuation of optimism over crop conditions has had a decidedly good effect. The bank statements resultant from the comptroller's recent call showed that there had been considerable increase in business activity, the excess of cash on hand having decreased and other features developed to show that capital is being used more freely and that there is less timidity on the part of lenders. Collections are reported by the machine tool-dealers to be good. Electrical lines in summer goods are showing a seasonable decrease, the summer demand having been about filled. Agricultural requirements are in an improved state.

The Union Electric Light & Power Company, St. Louis, is preparing plans for the improvement and possible reconstruction of its Tenth street plant and is also considering a branch distributing station at Forest Park boulevard and Vandeventer avenue, where it has acquired a site.

The Hallman-Dieckmann Refrigerator & Fixture Company, St. Louis, has been incorporated with a capital stock of $45,000 to extend its factory equipment for its business already operating under the same name.

A syndicate of grain dealers, represented by Marshall Hall, St. Louis, is making plans for the early construction of an elevator of 1,000,000-bu. capacity, with necessary machinery, power plant, etc.

The Simplex Shoe Machinery Company, St. Louis, has been incorporated with a capital stock of $150,000 by W. G. Battle, C. E. Clark and E. S. Wilson to manufacture shoe machinery.

The Union Sand & Material Company, St. Louis, will rebuild and re-equip its sand elevator at Drake, Mo., recently destroyed by fire with a loss of $25,000.

The Advance Elevator Company, East St. Louis, whose plant was destroyed by fire some months ago, will build a new plant to cost with mechanical equipment $350,000.

The fire and water commissioners, Kansas City, Mo., have plans for the installation of a branch pumping station to cost with its equipment between $150,000 and $200,000.

The Hope Fan & Blower Company, Kansas City, Mo., has been organized with a capital of $2000 by J. F. Hope, Anna Hope and J. T. Hope.

The city of Palmyra, Mo., has formally voted the expenditure of $32,000 for the increase of the capacity of its water and electric light plants. A filter plant will be installed.

The city of Kansas City, Mo., by public vote, has extended the franchise of the Metropolitan Street Railway 19 years and an extension of equipment, it is stated, will be made, particularly in power.

The Little Rock Compress Company, Little Rock, Ark., of which W. K. Kavanaugh is president, will equip a compress with a capacity of 20,000 bales at a cost of about $80,000.

The Harrison Electric Light & Ice Company, name changed to Harrison Gas & Electric Company, has in-

creased its capital stock from $45,000 to $100,000 and will increase its plant equipment.

The Spencer-McBride Lumber Company, Wilton, Ark., having purchased timber land, will install three mills to work it up; also planing mills. Hardwood and pine lumber equipment will be required.

C. E. Cruce, Morrillton, Ark., will equip an automobile repair shop and has already contracted for the necessary building.

Bids will be received by the city clerk, Arkansas City, Ark., until July 21, for enlarging the pumping station and furnishing a 2,000,000 gal. pumping engine, etc.

The Mulberry Milling Company's plant at Mulberry, Ark., has been burned with a loss of $15,000 on equipment and it is announced that it will be replaced at once.

The Canadian Power & Light Company, of which W. H. Dill, Okemah, Okla., is manager, will equip a hydroelectric plant of 2000 hp. capacity.

J. W. Tipton and C. B. Hale, Ringling, Okla., have plans for the construction and equipment with power plants, etc., of an interurban system.

The Smith Cotton & Ginning Company, McAlester, Okla., has been incorporated with a capital stock of $20,000 by M. M. Smith, Holdenville; E. W. Wilburn, Tecumseh, and N. Bert Smith, Wewoka, and is in the market for the equipment.

The city of Blackwell, Okla., will equip an electric light plant, under a bond issue. The mayor should be addressed.

The Inola Pipe Line Company, Inola, Okla., will equip a pipe line with pumps, etc., from the Cushing field to points in Kansas and Oklahoma, with a capacity of 22,000 bbl. daily.

The Yahola Pipe Line Company, Yahola, Okla., has been incorporated with a capital stock of $50,000 by J. H. Evans, W. H. Albro and Randolph Shirk, all of Tulsa, Okla., and will equip a pipe line, pumping plant, etc.

The city of New Orleans, La., has plans for the equipment of a lift bridge, with the necessary power plant. A. G. Ricks should be addressed.

The Louisiana Nut & Machine Company, of which Sam Blum is president, has acquired a plant at 327 Poydras street, New Orleans, and will re-equip it for the manufacture of machinery for cracking pecans, and other nuts.

The Palace Automobile Company, Alexandria, La., has been incorporated with a capital stock of $15,000 by Milton S. Fairfax and John S. Good and will equip a repair plant.

The Southern Automobile Mfg. & Supply Company, New Orleans, La., of which J. Bart Davis, Wells Fargo Building, is president, will install about $400,000 of equipment for the manufacture of trucks, runabouts, gasoline engines, etc.

The Pacific Northwest

SEATTLE, WASH., July 7, 1914.

A few important orders for machine tools are appearing though the business is by no means active. The Weyerhaeuser interests, which are building two large sawmills in Washington, have divided a good sized list among a number of firms, and considerable interest is taken in a list of heavy tools for the shipbuilding plant of the Puget Sound Navy Yard, for which figures were taken June 26.

A large amount of work is being done in overhauling mills and logging camps, and it is reported that many camps on the Columbia River will remain closed through the month. The most encouraging feature is an increase in Eastern lumber business, causing a slight advance in prices. Recent tendencies in the lumber trade here are strongly in favor of larger mills than have formerly been built, and such plants are not only thoroughly equipped as to wood-working and lumber-handling machinery, but usually maintain good-sized repair shops.

The Pacific Coast Coal Company, Seattle, is taking bids for a 15-ton locomotive crane for a new briquetting plant near Renton, Wash.

The Monroe Water Company, Seattle, Wash., will take over the plant, franchise and good-will of the Monroe Water & Light Company, Monroe, Wash. It has a capital stock of $100,000, and plans extensive improvements to the system, including a new electrically driven pumping plant of the most modern type. Sydney Marshall, Seattle, is president and manager.

A chemical plant, costing in the neighborhood of $1,000,000, will be built in Seattle by the Noble Metals Company, Seattle, according to announcements recently made by George E. Noble, the president.

The city commission, Centralia, Wash., has granted a franchise to B. F. Walling, Jr., to supply electrical current for lighting and power purposes in the city. Mr. Walling represents a syndicate and promises to build a power plant and have it ready for operation not later than February, 1915.

The Pacific Coast Gypsum Company, Tacoma, Wash., is making extensive improvements to its plant, including the building of an addition to the mill.

The East Oregon Lumber Company, Enterprise, Ore., will construct a mill. C. D. Logan, Enterprise, is president.

The Idaho National Harvester Company, Moscow, Idaho, according to G. P. Mix, the general manager, will make extensive improvements to its plant. Plans have been completed.

The Seattle Port Commission has instructed Paul P. Whitham, chief engineer, to prepare plans for a temporary cold storage plant on the East Waterway, which will cost about $60,000, and will have a capacity of 2,000,000 lb. of fish, and will be equipped to furnish 100 tons of ice per day. Plans will be ready for bids about the latter part of August.

Eastern Canada

TORONTO, ONT., July 11, 1914.

Mayor H. C. Brocken, chairman of the board of control, Toronto, Ont., is receiving tenders by registered post for the installation of coal and ash handling apparatus at the main pumping station of the city waterworks. Specifications are being furnished by the Department of Public Works.

The Mueller Brass Company, Sarnia, Ont., of which O. B. Mueller is president, will erect a foundry to cost $25,000.

The Canada Glue Company has completed plans for a manufacturing plant to be built at Brantford, Ont., at an estimated cost of $50,000.

The Orpen Conduit Company, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by L. C. Jarvis, J. D. Scott, M. C. Purvis, and others, to manufacture and deal in machinery, etc.

The Canadian Storage Battery Company, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by D. J. Coffey, R. E. MacKinnon, and others, to manufacture electrical storage batteries, motors, dynamos, engines, etc.

The Kortum Company, Ltd., London, Ont., has been incorporated with a capital stock of $25,000 by Albert Kortum, H. D. Metcalfe, W. H. Fox, and others, to manufacture polishing and buffing wheels, electroplating and polishers' supplies, etc.

The J. M. Diver Sons & Co., Ltd., Sarnia, Ont., has been incorporated with a capital stock of $100,000 by John M. Diver, G. B. Diver, and others, Sarnia, Ont., to carry on a lumber business and to manufacture lumber, etc.

The American Wood Working Machinery Company, Ltd., has been incorporated with a capital stock of $40,000 to manufacture wood-working machinery, etc. The company has appointed William Garlock, Toronto, to be its attorney.

The Horlick's Malted Milk Company has purchased 20 acres of land on the Tecumseh Road, Windsor, Ont., where it will erect a mammoth Canadian branch factory, which will employ upwards of 500 hands, in the manufacture of malted milk, etc.

Thompson E. Dick's foundry, Bolton, Ont., was totally destroyed by fire, including a large amount of machinery. The loss is estimated at $20,000.

The Dalhousie Lumber Company's mill, Dalhousie, N. B., was totally destroyed by fire. The loss will amount to $25,000.

The Town Council, Whitby, Ont., will spend $114,000 for sewage disposal works.

The mill of the Kent Lumber Company, Lunenburg, N. S., was destroyed by fire with a loss of $20,000.

The secretary of the Orillia Water & Light Company, Orillia, Ont., will receive bids until July 27 for furnishing and erecting a motor-driven turbine pump, etc.

Western Canada

WINNIPEG, MAN., July 10, 1914.

Machinery houses report the business situation practically unchanged since a week ago. Demand for supplies continues fair, and the outlook a little more favorable. Municipalities are purchasing considerable of the kinds of machinery and tools used in waterworks and electric light departments.

The Saskatchewan Cooperative Elevator Company, Regina, Sask., will erect several more elevators this summer to be ready for handling the crop next fall. Charles A. Dunning, Regina, is the manager.

The McLaren Lumber Company, Coleman, B. C., will treble the size of its plant. When completed the company will be able to cut 20,000,000 ft. of lumber a year.

The Ideal Furniture Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $20,000 to manufacture furniture, etc.

The Amalgamated Drydock & Engineering Company of British Columbia, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $250,000 to build and operate drydocks, etc.

The Canadian Marvelo, Limited, Vancouver, B. C., has been incorporated with a capital stock of $100,000 to manufacture animal foods, etc.

The Barclay Shingle Mills, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $25,000 to build and operate shingle mills.

The plant of the Fairview Sash & Door Mfg. Company, Fairview, B. C., was recently completely destroyed by fire, with a loss of about $25,000. Percy Sutherland and Frank Baldwin, owners, state that it will be rebuilt immediately.

The Standard Furniture, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $50,000 to manufacture furniture, etc.

The Standard Electric Welding Company, Vancouver, B. C., has been incorporated with a capital stock of $10,000 to operate a plant to do electric welding, etc.

The Cotton Shingle Mills, False Creek, Vancouver, B. C., was totally destroyed by fire and the pattern shop of the Empire Mfg. Company was considerably damaged. The loss will amount to many thousands of dollars as a large amount of machinery was destroyed.

The Buckeye Machine Company Ltd., Calgary, Alta., has been incorporated with a capital stock of $250,000 to manufacture machinery, etc.

The Fire & Ornamental Brick Company, Ltd., Medicine Hat, Alta., has been incorporated with a capital stock of $300,000 to manufacture ornamental brick, etc.

Government Purchases

JULY 13, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until July 28, schedule 7011, for one motor-driven vacuum pump, complete, for Norfolk.

Bids will be received by the U. S. Reclamation Service, 605 Federal Building, Los Angeles, Cal., until 2 p. m., July 20, for furnishing one 40-ton electric traveling crane, for the Salt River, Ariz., project.

LOCOMOTIVE CONSTRUCTION

Use of Heat-Treated and Alloy Steel

At the American Railway Master Mechanics' Association convention at Atlantic City, N. J., June 17 to 20, the committee on the use of special alloy and heat-treated steel in locomotive construction, A. R. Ayres, chairman, made public a summary of the replies received to a circular of inquiry sent out to railroads and locomotive builders. Replies were received from 37 railroads and two locomotive builders, covering an ownership of 31,000 locomotives. Briefly, these indicate the following, as reported in the Railway Age Gazette:

Question.—Do you use any heat-treated carbon steel in your locomotive construction?

Four roads are using heat-treated carbon steel frames and steel castings. Two are using heat-treated carbon steel for main and parallel rods; nine for piston rods and twelve for axles and crank pins. Two are using it for tires and wheels, compared with five one year ago. One has discontinued its use altogether, on account of unsatisfactory service obtained. The use of heat-treated carbon steel is still experimental, and does not appear to have been appreciably extended.

Question.—Do you use any alloy steels in locomotive construction?

Seventeen roads are using vanadium steel frames, showing an increase of nine over last year. Ten are using chrome-vanadium steel for main and parallel rods, nine for piston rods, four for valve-motion parts, twelve for axles and crank pins, and thirteen for tires and wheels. Many of those replying as users of alloy steels—in all cases chrome vanadium—are using it as an experiment, and not as their adopted practice.

Question.—Give any data you have showing length of service or additional wear obtained from heat-treated carbon steels as compared with plain carbon steels, and alloy steels as compared with plain carbon steels.

Service records and the personal observation of users of chrome-vanadium steel indicate that a considerable increase in wear is obtained as compared with plain carbon steel. Tests show that valve motion parts of case-hardened carbon steel are much harder and wear much better than corresponding parts of quenched and tempered vanadium steel. Other tests, which, however, are not yet concluded, between carbon steel axles and driving tires, compared with the same parts made of chrome-vanadium steel, indicate that considerable increase in wear may be expected from the vanadium steel. The Grand Rapids & Indiana Railroad reported an average increase of 40.5 per cent. in mileage of vanadium steel tires over carbon steel tires. The Lake Shore reported an average increase of 38 per cent. in mileage of vanadium steel axles over carbon steel axles.

Question.—If you have had failures of heat-treated steel, either carbon steel or alloy steel, which were attributed to defects in the original material or to the character of heat-treatment, please describe them, giving as much detail as possible concerning the cause of failure.

The replies to this question indicate that the method of heat treatment is an active cause of failure of both heat-treated carbon steel and alloy steels; that is, unless the quenching and tempering is properly done there is danger of checking and the production of cracks and unequal stresses. The majority of failures have been attributed to piping, segregation, impurities and injurious effects of improper quenching.

Question.—If you are using in your design heat-treated carbon or alloy steels, give the unit fiber stress you are allowing for these steels in your design.

In designing locomotive parts, the general practice is to use the same working stresses for heat-treated carbon and alloy steels as for plain carbon steel, it being considered preferable on account of lack of experience with these materials to consider their additional strength simply as a greater insurance against failure.

Question.—If you are using either heat-treated carbon or alloy steels, are you requiring any drilling, such as drilling through the center of an axle, in order to provide for heat-treatment or to detect defective material?

Four roads require drilling of quenched and tempered axles compared with three that reported this requirement last year. Eight roads, which did not require drilling last year, reported no change in their practice this year, except one, on which drilling is now required. There are altogether six roads that are either drilling, or are contemplating drilling, which did not do this last year.

Question.—What kind of steel are you using for locomotive and tender springs?

Thirteen roads are using vanadium springs principally for test purposes. One of these roads reported that vanadium springs did not reduce the number of spring failures in spite of the fact that stronger physical properties were attributed to the steel. The remaining 26 roads that replied are using springs of 0.90 to 1.10 per cent. carbon steel.

Question.—What fiber stress do you use in designing springs? If you use a different fiber stress for different grades of steel, please give full details.

Vanadium springs have been designed with the fiber stress of 100,000 lb. per sq. in., which indicates it to be a safe value. Carbon steel springs are usually designed with a fiber stress of 80,000 lb. per sq. in. However, the working stresses used in the design of springs appear to be more or less uniform, no allowances generally being made for the kind of steel used.

The Midland sheet steel plant, Muncie, Ind., belonging to the American Sheet & Tinplate Company, is being dismantled and the machinery removed. It has been idle two to three years, and was only intermittently in operation for five or six years previously.

Trade Publications

Saws—Henry Disston & Sons, P. O. Box 1537, Philadelphia, Pa. Pamphlet. Contains a treatise on saws and how to keep them in order and is a portion of the company's regular saw handbook dealing with hand and metal cutting saws, levels, files and other hand tools. Short articles describing the making of the various lines are given, in which only the most important processes are referred to, the text being supplemented by a number of engravings of the tools themselves and views of portions of the plant. Mention is made of a line of saws for cutting metal and inserted tooth and band saws. In the file section views of the sections of the different shapes of file steel are given, together with engravings of the different cuts and instructions on the kinds, shapes and uses of files.

Industrial Laboratory.—Detroit Testing Laboratory, 674 Woodward avenue, Detroit, Mich. Pamphlet. Points out the advantages of employing a laboratory to make tests of raw material and finished products, as well as solving problems that come up in connection with manufacturing processes. The work which this company is prepared to do includes metallurgical and chemical research work, fuel analysis and the analysis of such commercial substances as soaps, varnishes, lubricating oils, explosives, tanning materials, etc.

Screws and Bolts.—Pittsburgh Screw & Bolt Company, Pittsburgh, Pa. Catalogue No. 9. Lists the various sizes and kinds of screws and bolts that can be supplied. The catalogue is divided into sections which are rendered readily accessible by a thumb index, one for each particular type of bolt or screw, and an engraving is presented on the first page of the section, followed by a table with prices of the various sizes that can be supplied. The lines covered include machine, carriage, coach, tap and special bolts; cold and hot pressed nuts, coach screws, rivets, rods, set and cap screws and milled studs. A number of tables of weights of steel and iron bars are included.

Safety Guard for Presses and Drop Hammers.—Corbin Cabinet Lock Company, New Britain, Conn. Pamphlet. Gives a brief description with numerous illustrations of a safety guard for presses and drop hammers. The special feature of the guard, which consists of a free swinging rod of light material, is that it touches the arms above the elbow with only a very slight pressure. The illustrations show the guard applied to various types of presses and a board drop hammer. An illustrated description of the guard appeared in *The Iron Age*, April 2, 1914.

Pipe Covering.—Armstrong Cork & Insulation Company, Pittsburgh, Pa. Pamphlet. Concerned with the use of a cork covering for brine, ammonia, ice water, beer and cold water lines, cylindrical brine coolers, ammonia accumulators, ice water tanks, filters, etc. A brief description of the importance of covering cold pipes and the essential qualities of such a covering are briefly touched upon, followed by a description of the Nonpareil cork covering of this company with special reference to its durability, ease and application, neatness in appearance and slow burning qualities. A description is given of some tests that were made of the covering together with tables of results. Data on the loss of refrigeration in pipe lines are included, together with directions for applying the covering and specifications for cork covering. The specifications are supplemented by a number of drawings illustrating various points and a number of views of actual installations of the covering are included.

Water Tube Boilers.—A. D. Granger Company, 90 West street, New York City. Fifth edition of bulletin No. 2. Concerned with the Oswego internally fired water tube boiler, for which the advantages of safety and fuel economy and rapid steam generation are claimed. Descriptions of both the high and low pressure types are presented, together with illustrations of them and condensed tables of specifications. A number of views of plants in which these boilers have been installed are given, together with a drawing showing the comparative amount of space occupied by a 135-hp. unit and a 125-hp. horizontal return tubular boiler with a brick setting.

Trap Door Corners.—A. F. Wagner Architectural Iron Works, Milwaukee, Wis. Pamphlet. Treats of a universal malleable iron cover for trap doors, which is intended for use with angle iron frames for any size of wood or steel trap door. One of the advantages claimed for this arrangement is that it is possible to turn out a frame in a comparatively short space of time. An engraving of the corner is included in the pamphlet.

Pneumatic Rapper.—Western Tool & Mfg. Company, Springfield, Ohio. Leaflet. Deals with a pneumatic rapper or vibrator for use in connection with a molders' bench. Although designed primarily for use in connection with the company's bench, it can be furnished separately if desired. A brief mention of the bench and an illustration of it are included.

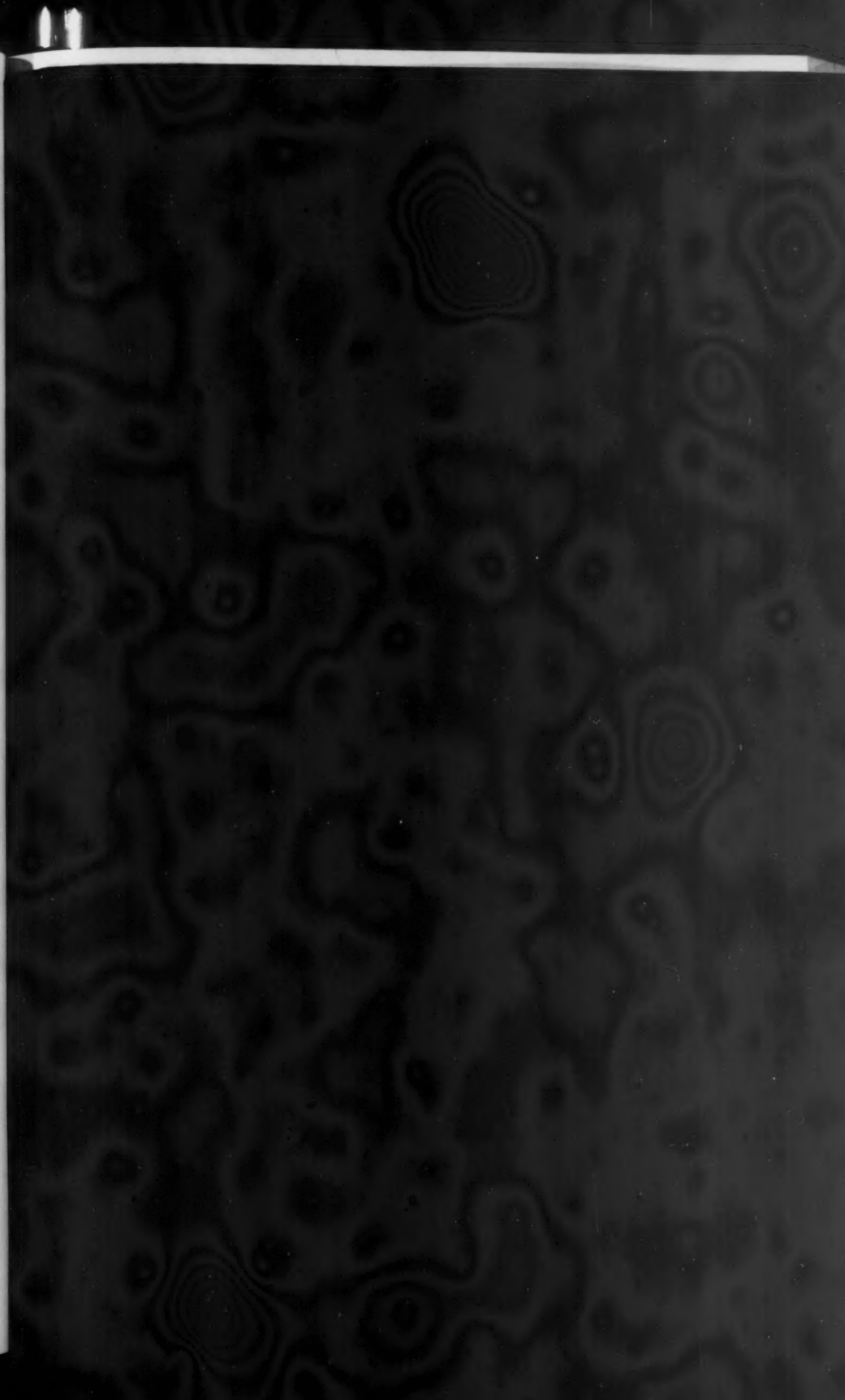
Machinists' Tools and Supplies.—Samuel Harris & Co., 114 North Clinton street, Chicago, Ill. Describes by means of numerous illustrations an extensive line of supplies and tools used by machinists and manufacturers in various industries. The lines covered include hand tools of different kinds, gears, reamers, chucks, punching and shearing machines, oil cups, steel of various kinds, squares and gauges, pulleys and a line of wood and metal working lathes and drilling machines. A number of tables of useful information are included with an index to facilitate the finding of any particular item that is desired, as well as a comprehensive index of the tools covered.

Marking Crayons.—Zelnicker Crayon Works, St. Louis. Illustrated circular. Calls attention to the various kinds of crayons manufactured by the company for making either rough or smooth surfaces. These crayons are carefully made and are asserted to be strictly waterproof. They are suitable for marking bundles, boxes, barrels, glass, leather and iron and other metals. The soapstone crayons are sawed from stone of extra strong fiber and are stated to make marks on steel that fire will not burn off. Lumber crayons are made in different colors and for both dry and green lumber.

Molding Machines.—S. Freeman & Sons Mfg. Company, Racine, Wis. Catalogue. Presents a description of a full line of Dearsley molding machines, which includes stripping plate, roll-over, strip and roll machines with various modifications for adapting them to different requirements. Mention is of the match plates, metal patterns, flasks and flask designs can also be supplied by the company. One of the special features of the catalogue is the clear manner in which the halftones illustrate the several types of equipment and the work for which they are adapted.

Metal Cutting Machinery, Concrete Reinforcing and Boilers.—Joseph T. Ryerson & Son, Chicago, Ill. Two bulletins and two numbers of the company's technical library. The first bulletin, No. 9071, describes and illustrates a high speed friction saw for use in railroad car, frog and switch shops, for cutting rails, beams, angles, channels, tees, zees, round bars, etc., and the various special sections that are now used in steel car construction. The cutting blade is mounted on the armature shaft of the driving motor and is equipped with either handwheel, hydraulic, pneumatic or independent motor feed. The second bulletin, No. 13,071, illustrates the Lennox serpentine shear, which is designed particularly for the straight and irregular cutting of sheets and plates from No. 16 gauge down to ¼ in. A brief description of the machine is presented, together with illustrations of the machine and some of the shapes that have been cut on it. An illustrated description of this machine appeared in *The Iron Age*, February 26, 1914. The first of the numbers of the technical library, No. 4, pertains to internal furnace boilers, equipped with Morison corrugated furnaces. The construction of the boilers is gone into at some length and the text is supplemented by a number of halftone and line engravings, showing the different boilers and some of the plants in which they have been installed. A number of testimonial letters are included, together with a partial list of users. The other, No. 8, embodies a brief description of the company's reinforcing bars, which can be supplied in square twisted or plain square and round shapes. Mention is made of a hand machine for bending the bars and the various types of expanded metal and sheet steel centering that can be supplied.

Diesel Engine.—Fulton Mfg. Company, Erie, Pa. Bulletin E. Relates to a four-cycle Diesel engine, using oil of a very low grade as fuel. A description of the principle of operation and the construction of the engine is given, together with the results of tests made on it. These engines, which were illustrated in *The Iron Age*, April 2, 1914, are built in three sizes, for developing 50, 70 and 100 hp. respectively, and an outline diagram of the engine with dimensions for the different sizes is included.

Ball Bearings—Hess-Bright Mfg. Company, Front street and Erie avenue, Philadelphia, Pa. Folder. Contains a list of distributors of the company's ball bearings in the United States and Canada. These firms carry a complete line of bearings in stock, and if repairs are necessary to any bearing in service, it is simply shipped to the nearest distributor who exchanges it for one that has been repaired at the factory. In this way there is practically no delay in securing repairs to bearings.

Steel Castings.—Sivyer Steel Casting Company, Milwaukee, Wis. Booklet. Describes the company's method of manufacturing steel castings, together with some general data on the subject. A number of engravings showing various portions of the plant are presented as well as illustrations of castings, ranging from 1/69 to 800 lb.